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ADMINISTRATION, COMMERCE AND COMPUTER TECHNOLOGY

COMPUTER SCIENCE TECHNOLOGY

PROGRAM OF STUDY
420.A0

SPECIALIZATION STREAMS:
ADMINISTRATIVE DATA PROCESSING
INDUSTRIAL DATA PROCESSING
NETWORK MANAGEMENT

la FORMATION PROFESSIONNELLE et TECHNIQUE

Québec

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Direction générale des programmes
et du développement

ISBN 2-550-37108-9

Legal deposit – Bibliothèque nationale du Québec, 2001

420.A0	**Computer Science Technology**	2000

Type of certification: Diploma of College Studies

Number of credits: 91 2/3

Duration: 2 580 to 2 730 hours of instruction

General education component:	660	hours of instruction
Program-specific component:		
Common core and specialization stream:		
Administrative Data Processing:	1 980	hours of instruction
Industrial Data Processing:	1 920	hours of instruction
Network Management:	2 070	hours of instruction

Special conditions for admission:

- Mathematics 536

Acknowledgements

The Ministère de l'Éducation would like to thank the many people in the business and educational communities who helped in the development of this program, in particular the following individuals, who took part in the development of the program-specific component of this technical program.

For the *Administrative Data Processing* specialization stream

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A.R.C. Informatique

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Téléuniversité

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Sylvain Béland (first meeting)
Cégep André-Laurendeau

Jean-Claude Bélanger (first meeting)
Cégep de Sainte-Foy

Marlène Bergeron (first and second meetings)
Cégep de la Gaspésie et des Îles

Luc Chapleau (first and second meetings)
Cégep de Saint-Laurent

Luc Charbonneau (second meeting)
Cégep de l'Outaouais

Richard Cordeau (first and second meetings)
Cégep Saint-Jean-sur-Richelieu

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Cégep d'Alma

Alison Popiel (first and second meetings)
Champlain Regional College (Saint-Lambert)

Linda Viel (first and second meetings)
Cégep de Matane

The Ministère de l'Éducation would also like to thank the following individuals for their contribution to the development of the training project or of the objectives and standards of the program-specific component of the study program.

Business Community

Réal Ouellette
Groupe LGS Inc.

José-M. Pénélas-D.
Collège Delta

Emmanuel Pirsch
Groupe Conseil DMR Inc.

Educational Community

Bernard Bérubé
Cégep de Saint-Jérôme

Patrice Castonguay
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For the *Industrial Data Processing* specialization stream

Business Community

Jean-François Belleau
H.M.R. inc.

Michel Bouchard
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François Bujold
Via Rail

Martin Chamberland
Centre de recherche minérale du Québec

Yves Collin
Services Accès-Vidéo inc.

Joël Falardeau
Hydro-Québec

Stéphane Godin
ICAM Technologies CORP.

Martin Lacasse
Berclain

Claude Leclerc
Mitel

Marc Lefebvre
Multimeg Électronique inc.

Alberto Mouron
A.L. Van Houtte

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The Ministère de l'Éducation would also like to thank the following individuals for their contribution to the development of the training project or of the objectives and standards of the program-specific component of the study program.

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Martin Rheault
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For the *Network Management* specialization stream

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Gilles Paiement (first and second meetings)
Cégep de St-Hyacinthe

André Pausé (first meeting)
Cégep de Rivière-du-Loup

The Ministère de l'Éducation would also like to thank the following individuals for their contribution to the development of the training project or the objectives and standards of the program-specific component of the study program.

Business Community

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TABLE OF CONTENTS

INTRODUCTION TO THE PROGRAM

The Computer Science Technology program is in keeping with the aims and orientations of technical education that guide the Direction générale de la formation professionnelle et technique. It has been designed in accordance with the framework for developing technical programs, which requires participation by partners from the business and education communities.

This program is formulated in terms of competencies, objectives and standards. It was designed using an approach that takes into account training needs, the employment situation and the general goals of technical education, and it will provide the basis for the definition and evaluation of learning activities. It lends itself to the application of the program-based approach.

The Computer Science Technology program includes a general education component common to all programs (16 2/3 credits), a general education component specific to the program (6 credits), a general education component complementary to the other program components (4 credits) and a program-specific component (65 credits) in either Administrative Data Processing, Industrial Data Processing or Network Management.

This document has two parts. Part One presents an overview of the program, and Part Two describes the objectives and standards for the general education components and the program-specific component.

VOCABULARY USED

Program

An integrated set of learning activities leading to the achievement of educational objectives based on set standards (College Education Regulations, section 1).

Competency

For the specific program component of a technical program: an integrated set of cognitive and psychomotor skills and socio-affective behaviours that enable a student to exercise a role or function, perform a task or carry out an activity at entry level on the job market (Cadre technique d'élaboration de la partie ministérielle des programmes d'études techniques, p. 3).

Objective

The competency, skills or knowledge to be acquired or mastered (College Education Regulations, section 1).

Statement of the competency

For the specific program component of a technical program, the statement of the competency is the result of an analysis of the work situation, the general goals of technical education and, in certain cases, other factors. It consists of an action verb and an object. It must be clear and unequivocal.

For the general education component, the statement of the competency is the result of an analysis of the needs of general education.

Elements of the competency

For the specific program 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 in exercising the competency or the essential elements of the competency.

For the general education component, the elements of the objective, formulated in terms of a competency, specify the essential elements of the competency. They include only what is necessary in order to understand and attain the competency.

Standard

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

Achievement context

For the specific program 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

For the specific program component of a technical program, the performance criteria define the requirements that make it possible to judge the attainment of each of the elements 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.

For the general education component, 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 attained.

Learning activities

For the specific program component of a technical program, the learning activities are classes (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 applying the program-based approach.

For the general education component, 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 ONE

GOALS OF THE PROGRAM

The Computer Science Technology program contains three specialization streams: Administrative Data Processing, Industrial Data Processing and Network Management.

The program is designed to provide students with the skills necessary to work as programmer-analysts in the areas of administrative data processing, industrial data processing and network management.

The program's goals reflect the general and specific aims of technical education.

The following paragraphs define the results that each specialized training program is designed to obtain, and give a general description of the occupation as well as the educational intentions of both the technical and general education components.

Objectives

The Administrative Data Processing specialization stream of the Computer Science Technology program is designed to equip students with the skills necessary to carry out the duties of a programmer-analyst in the administrative field.

The Industrial Data Processing specialization stream of the Computer Science Technology program is designed to equip students with the skills necessary to carry out the duties of a programmer-analyst in the field of industrial programming.

The Network Management specialization stream of the Computer Science Technology program is designed to equip students with the skills necessary to carry out the duties of computer network administrator.

Description of the Occupation

Specialization Stream: ***Administrative Data Processing***

Programmer-analysts must meet the needs of various types of companies. They may work within companies that produce software or provide data processing services. Programmer-analysts are most frequently called upon to develop applications in response to requirements arising from company growth. However, due to market globalization, constant advances in technology and the growing importance of data and communications, this field is experiencing major changes, which are reflected in increasing levels of diversification and a much greater demand for new products. Among these new products are the communications applications that support group work (in-house), those that support data exchanges between companies and those that make use of the information highway to accomplish various tasks, particularly commercial ones. These new applications can be described as user-friendly, interactive multimedia. Programmer-analysts will thus be increasingly required to integrate these qualities into the design of their applications.

The tasks assumed by programmer-analysts vary with company size and the type of business activity. As most of their work is with small and medium-sized businesses, programmer-analysts must be versatile. Their work could involve any of the various steps in the development of an industrial application: analysis and design, development and testing, or the installation and integration of systems into targeted data processing environments. In addition to this, programmer-analysts are responsible for the production of documentation and user training. They must also maintain and improve the client company's existing software applications and assume the role of resource persons for users. Furthermore, programmer-analysts are called upon to perform tasks related to operating systems, such as the installation and configuration of new hardware, software, local area networks and technical support.

Programmer-analysts are often confronted with new situations arising from the nature of their work, different types of data processing environments, company policies and practices, etc. They must therefore be flexible, quick learners and accomplished problem solvers. More specifically, these professionals must have strong logical and analytical skills, and be adept at synthesizing information. In the practice of their occupation, they must demonstrate independence, resourcefulness, perseverance and great interest in technical developments. It goes without saying that project-oriented work organizations, which are particularly favoured by data processing departments, require programmer-analysts to be team players with excellent communication and interpersonal skills.

The Computer Science Technology program (Administrative Data Processing specialization stream) meets two requirements of college-level education: versatility and the mastery of technical skills.

Students' versatility is ensured by their acquisition of general competencies necessary for programmer-analysts to independently accomplish any task with which they may be confronted on a daily basis. They will also have the skills to adapt to various work conditions resulting from both technological advancements and changes in their organization. The general skills acquired from the Computer Science Technology program (Administrative Data Processing specialization stream) will provide the students with the expertise to meet the intellectual requirements of their work, to build and maintain quality interpersonal relationships, to communicate effectively, to manage their professional activities and to apply the principles, techniques and methods proper to the data processing domain.

The students' mastery of technical skills, an absolute necessity for entering the job market, is ensured by the acquisition of specific skills necessary for the exercise of the occupation. As programmer-analysts may be called upon to participate in any phase in the development of software applications, the specific skills cover all the different elements proper to the occupation. This mastery of a variety of skills also contributes to job mobility.

Specialization Stream: ***Industrial Data Processing***

Programmer-analysts specialized in industrial data processing must meet the processing needs of companies that manufacture goods or process raw materials, as well as those of public corporations whose activities depend on advanced technology. These professionals work in companies of various sizes, where they contribute to the development and modification of specialized software programs to meet the manufacturing and administrative needs of industrial production. They must ensure that the different industrial systems and applications can communicate with each other, by creating communications interfaces between the hardware and software components of production systems.

In most of these manufacturing and processing companies, programmer-analysts are responsible for the development of production software and the smooth operation of the factory's computer systems. They are therefore key players in manufacturing companies.

The tasks assumed by programmer-analysts in the manufacturing sector vary according to the size of the company, the nature of its business activities, the type of factory, etc. The programmer-analysts must be versatile. Their work could involve any of the various steps in the development of an industrial application: analysis and design, development and testing, or the installation and integration of systems into targeted data processing environments. In addition to this, programmer-analysts are responsible for the production of documentation and user training. They must also maintain and improve the client company's existing software applications and provide technical support to the engineers and factory workers who use the systems.

Programmer-analysts in the manufacturing sector are often confronted with new situations arising from the nature of their work, the different types of industrial environments, the level of factory automation, etc. They must therefore be flexible, quick learners and accomplished problem solvers. More specifically, these professionals must have strong logical and analytical skills, and be adept at synthesizing information. In the practice of their occupation, they must demonstrate independence, resourcefulness, perseverance and great interest in technical developments. It goes without saying that project-oriented work organizations, which are particularly favoured by data processing departments, require programmer-analysts to be team players with excellent communication and interpersonal skills.

The Computer Science Technology program (Industrial Data Processing specialization stream) meets two requirements of college-level education: versatility and the mastery of technical skills.

The students' versatility is ensured by their acquisition of general competencies necessary for programmer-analysts to independently accomplish any task with which they may be confronted on a daily basis. They will also have the skills to adapt to various work conditions resulting from both technological advancements and changes in their organization. The general skills acquired from the Computer Science Technology program (Industrial Data Processing specialization stream) will provide the students with the expertise to meet the intellectual requirements of their work, to build and maintain quality interpersonal relationships, to communicate effectively, to manage their professional activities and to apply the principles, techniques and methods proper to the data processing domain.

The students' mastery of technical skills, an absolute necessity for entering the job market, is ensured by the acquisition of specific skills directly linked with the occupation's tasks. As programmer-analysts may be called upon to participate in any development phase of an integrated manufacturing information system, their specific skills cover all the elements used in the exercise of the occupation. This mastery of a variety of skills also contributes to job mobility.

The industrial speciality is relatively new within the data processing field and one can expect that the development and integration of new industrial technologies will be, in the short term, a primary responsibility of industrial data processing specialists. In response to market evolution, production and processing companies are installing computer-aided systems in order to automate production processes. This evolution in production will certainly be reflected in the requirements placed on programmer-analysts specializing in the industrial field.

Specialization Stream: ***Network Management***

Computer network administrators are called upon to work in or with companies of all sizes. Large companies having their own computer services often employ several such professionals, while small and medium-sized businesses often benefit from their services as consultants. When employed by a small company, the network administrator is usually the sole person responsible for maintaining the company's computer systems and network. The larger the company, the larger the computer support team and the

more specialized the role of each team member becomes. This is because larger companies usually have larger, more complex computer networks.

Network administrators' expertise may be required at any stage of the network-creation process. They plan network installation or migration, ensure that the necessary equipment is available for installation, configure each component and verify performance, supervise the network processes, manage security issues and provide technical support to users. Much of the network administrators' time is spent solving problems. Thus, they must be able to quickly and accurately determine the cause of a problem and correct it, taking into account the effects on the network as a whole.

Versatility is a very important characteristic for network administrators because they are confronted with diverse problems that must be resolved quickly. To act speedily under stress requires that they be able to draw upon all their resources and apply their knowledge and experience any time a problem arises.

The Computer Science Technology program (Network Management specialization stream) meets two requirements of technical education, versatility and the mastery of technical skills. The students' mastery of technical skills is ensured by the acquisition of those skills necessary for the exercise of the occupation. The students' versatility is ensured by their acquisition of general competencies in mathematics, data processing, management and communications.

The computer network, especially the local area network, represents a relatively new technology that will certainly evolve and expand into many different domains with the advent of technical advancements and the further integration of computer networks with existing technologies, such as video and telecommunications. Although, some network-video and network-telecommunications systems already exist, the current cost of developing such systems prohibits widespread use. Due to the speed at which technology is evolving, programmer-analysts must continually work to keep current with the latest developments in their field.

Educational Intentions

In accordance with the general goals of the technical training, the program-specific component of the Computer Science Technology program aims to:

- enable students to acquire competence in the exercise of the occupation; to carry out the functions, tasks and activities of the occupation at the level required for entry into the job market;

- help students integrate into professional life by giving them a general knowledge of the job market, as well as an understanding of the specific context of the selected occupation;

- foster the students' personal growth and encourage continuing professional development;

- provide for the future job mobility of students by helping them to acquire career-management skills.

THE GOALS OF GENERAL EDUCATION

In Québec, college is the next stage after the compulsory years of schooling (elementary and secondary school) during which students acquire basic knowledge and skills. It represents a major crossroads in that there is greater emphasis on the cultural aspect of academic subjects and leads students directly to the labour market or to university. The college system is responsive to current needs with respect to technical and pre-university education. It allows students to further their education without, however, 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.

Each college program features a general education component that is common to all programs, one that is adapted to the specific field of study, and one that is complementary. The goals of general education are to provide students with a common cultural core, to help them learn and develop generic skills, and to foster desirable attitudes. The desired outcomes are to educate students, to prepare them for their role as responsible members of society and to enable them to share in the common cultural heritage.

The common cultural core

Transmission of the common cultural core is aimed at allowing students to develop or acquire the following:

- mastery of the language of instruction as a tool for communication and reflection, and mastery of the basic rules of rational thought, discourse and argumentation;
- the ability to communicate in other languages, primarily French or English;
- openness to the world and to cultural diversity;
- appreciation of the riches of their cultural heritage through familiarization with the accomplishments of human civilization;
- the ability to situate themselves with respect to the major schools of thought;
- the ability to think critically, independently and reflectively;
- personal and social ethics;
- mastery of knowledge relevant to the development of physical and intellectual well-being;
- awareness 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 in analyzing situations;
- the ability to apply what they have learned in determining appropriate action;
- mastery of work methods;
- the ability to reflect on what they have learned.

Desirable attitudes

Cultural literacy and generic skills help students to acquire and develop the following attitudes:

- autonomy;
- a critical sense;
- awareness of their responsibilities toward themselves and others;
- openmindedness;
- creativity;
- openness to the world.

These outcomes apply to the three general education components, more specifically:

- General education 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 adapted to programs, which introduces tasks or learning situations that are relevant to the field of study. 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, which allows students to complete their training with learning activities chosen with a view to achieving balance and complementarity in relation to 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 literacy and computer science;
  - art and aesthetics.

The general and the specific education components are designed to contribute to students' education in an integrative fashion. In other words, the knowledge and skills transmitted in one component are reinforced and, whenever possible, reapplied in the other.

Each college-level institution must provide such general education through learning activities that are consistent with its educational project, within the framework of the stated outcomes, the given subject areas and ministerial guidelines.

All the sets of objectives and standards in the general education component are developed in keeping with the provisions of the *College Education Regulations* (R.S.Q., c. C-29, s. 18; 1993, c. 25, s. 11). Revised Edition, August 1998.

EDUCATIONAL INTENTIONS OF GENERAL EDUCATION

The educational intentions explain in detail the contribution of each field of studies included in the three components of general education (common to all programs, adapted to programs or complementary) to the achievement of the goals of general education. For the first two components, the educational intentions include a general statement of the role of each field of studies, the principles which underlie this role, the contribution of each field, in the form of outcome objectives, to the achievement of the goals of general education in terms of knowledge, abilities and attitudes, and an explanation of the sequence of objectives and standards.

The integral text of the educational intentions is at the end of this document.

LIST OF PROGRAM OBJECTIVES

GENERAL EDUCATION 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 ADAPTED TO PROGRAMS

(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

(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.

SPECIFIC PROGRAM COMPONENT

(65 credits)

Common Education Component for the *Administrative Data Processing*, *Industrial Data Processing* and *Network Management* Specialization Streams

016N Analyze the work functions.

016P Solve computer-related mathematical and statistical problems.

016Q Exploit the possibilities of an operating system on a specific computer.

016R Install hardware and software on a computer.

016S Use a structured programming language.

016T Use an object-oriented development approach.

016U Research information.

016V Interact and communicate in various work situations.

Common Objectives and Standards for the *Administrative Data Processing* and *Industrial Data Processing* Specialization Streams

016W Produce algorithms.

016X Develop a user interface.

016Y Plan and manage work activities.

016Z Produce and manage documentation.

Objectives and Standards for the *Administrative Data Processing* Specialization Stream

0170 Organize and use data.

0171 Correct programs.

0172 Analyze the features of the information systems of various companies with a view to developing computer-aided solutions.

0173 Develop conceptual models using the structured approach.

0174 Exploit the possibilities of a networked computing environment.

0175 Create and use databases.

0176 Make functional improvements to an application.

0177 Ensure the quality of an application.

0178 Use multimedia processing utilities.

0179 Provide technical support and training to users.

017A Install an application.

017B Design and develop an application in a database environment.

017C Design and develop an application in a graphics environment.

017D Design and develop a hypermedia application within internal and global networks.

Objectives and Standards for the *Industrial Data Processing* Specialization Stream

017E Analyze an industrial production environment.

017F Analyze the potential of an industrial peripheral.

017G Organize and store the data of an industrial system.

017H Create a communications link between an industrial system's hardware and software.

017J Develop a data transfer interface between industrial applications.

017K Develop an industrial application.

017L Conduct integration and stress tests.

017M Analyze an industrial system.

017N Diagnose and resolve the performance problems of an industrial system.

017P Develop and deliver an application suite for an industrial system.

Objectives and Standards for the *Network Management* Specialization Stream

017Q Use an algorithmic approach.

017R Analyze the architecture of a computer network.

017S Choose hardware.

017T Optimize the functionalities of an operating system on a computer.

017U Ensure the security of a computer network's hardware and software.

017V Manage a computer population.

017W Manage a computer network.

017X Choose software.

017Y Manage their time and ensure the quality of their work.

017Z Provide technical support to network users.

0180 Ensure the evolution of the computer network.

0181 Develop utilities.

0182 Diagnose and resolve network problems.

0183 Set up a server.

0184 Set up Internet-related technologies and services.

0185 Plan the installation of a computer network.

0186 Install a computer network.

0187 Manage a computer network.

HARMONIZATION

The technical program, *Computer Science Technology* (420.A0) has been designed and written in such a way as to harmonize it with the technical program, *Computing Support* (5729). The purpose of the harmonization is to optimize the students' progress in their training by making it easier for them to go from one program to another or from one educational level to another without duplication of learning content.

FROM SECONDARY SCHOOL TO COLLEGE

Students who have successfully completed the secondary school *Computing Support* program may receive credit for the following corresponding competencies of the *Network Management* specialization of the *Computer Science Technology* program, if they continue their studies at the college level.

FROM COMPUTING SUPPORT		TO NETWORK MANAGEMENT	
SESAME	**COMPETENCY**	**CODE**	**COMPETENCY**
962038	Exploit the possibilities of operating systems using older technology.	016Q	Exploit the possibilities of an operating system on a specific computer.
962096	Exploit the possibilities of operating systems using recent technology.	017T	Optimize the functionalities of an operating system on a computer.
962052	Research information.	016U	Research information.
962166	Exploit the possibilities of telecommunications facilities.		
962068	Develop a utility program.	017Q	Use an algorithmic procedure.
		016S	Use a structured programming language.
962074	Interact in various work situations.	016V	Interact and communicate in various work situations.
962025	Analyze the architecture and operation of computer systems.	016R	Install hardware and software on a computer.
962116	Install the hardware and software of a computer.		
962148	Manage access to the resources of a network.	0183	Set up a server.
962157	Install the shareable resources of a network.		

Students having successfully completed the secondary school *Computing Support* program may receive credit for the following corresponding competencies of the *Administrative Data Processing* specialization of the *Computer Science Technology* program, if they continue their studies at the college level.

FROM COMPUTING SUPPORT		TO ADMINISTRATIVE DATA PROCESSING	
SESAME	**COMPETENCY**	**CODE**	**COMPETENCY**
962038 962096	Exploit the possibilities of operating systems using older technology. Exploit the possibilities of operating systems using recent technology.	016Q	Exploit the possibilities of an operating system on a specific computer.
962052 962166	Research information. Exploit the possibilities of telecommunications facilities.	016U	Research information.
962068	Develop a utility program.	016W 016S	Produce algorithms. Use a structured programming language.
962074	Interact in various work situations.	016V	Interact and communicate in various work situations.
962025 962116	Analyze the architecture and operation of computer systems. Install the hardware and software of a computer.	016R	Install hardware and software on a computer.
962122	Manage their time.	016Y	Plan and manage work activities.
962186 962205	Troubleshoot a computer problem. Provide technical support at a telephone help desk.	0179	Provide technical support and training to users.

Students having successfully completed the secondary school *Computing Support* program may receive credit for the following corresponding competencies of the *Industrial Data Processing* specialization of the *Computer Science Technology* program, if they continue their studies at the college level.

FROM COMPUTING SUPPORT		TO INDUSTRIAL DATA PROCESSING	
SESAME	**COMPETENCY**	**CODE**	**COMPETENCY**
962038	Exploit the possibilities of operating systems using older technology.	016Q	Exploit the possibilities of an operating system on a specific computer.
962096	Exploit the possibilities of operating systems using recent technology.		
962052	Research information.	016U	Research information.
962066	Exploit the possibilities of telecommunications facilities.		
962068	Develop a utility program.	016W	Produce algorithms.
		016S	Use a structured programming language.
962074	Interact in various work situations.	016V	Interact and communicate in various work situations.
962025	Analyze the architecture and operations of computer systems.	016R	Install hardware and software on a computer.
962116	Install the hardware and software of a computer.		
962122	Manage their time.	016Y	Plan and manage work activities.

FROM COLLEGE TO SECONDARY SCHOOL

Students having successfully completed the *Network Management* specialization of the *Computer Science Technology* college program may receive credit for the following corresponding competencies of the secondary school *Computing Support* program, if they continue their studies at the secondary level.

FROM NETWORK MANAGEMENT		TO COMPUTING SUPPORT	
CODE	**COMPETENCY**	**SESAME**	**COMPETENCY**
017Q 016S	Use an algorithmic procedure. Use a structured programming language.	962068	Develop a utility program.
016P	Exploit the possibilities of an operating system on a specific computer.	962038	Exploit the possibilities of operating systems using older technology.
017T	Optimize the functionalities of an operating system on a computer.	962096	Exploit the possibilities of operating systems using recent technology.
016R	Install hardware and software on a computer.	962025 962116	Analyze the architecture and operation of computer systems. Install the hardware and software of a computer.
017Y	Manage their time and ensure the quality of their work.	962122	Manage their time.
016U	Research information.	962052	Research information.
016V	Interact and communicate in various work situations.	962074	Interact in various work situations.
0183	Set up a server.	962148 962157	Manage access to the resources of a network. Install the shareable resources of a network.

Students having successfully completed the *Administrative Data Processing* specialization of the *Computer Science Technology* college program may receive credit for the following corresponding competencies of the secondary school *Computing Support* program, if they continue their studies at the secondary level.

FROM ADMINISTRATIVE DATA PROCESSING		**TO COMPUTING SUPPORT**	
CODE	**COMPETENCY**	**SESAME**	**COMPETENCY**
016W 016S	Produce agorithms. Use a structured programming language.	962068	Develop a utility program.
016Q	Exploit the possibilities of an operating system on a specific computer.	962038 962096	Exploit the possibilities of operating systems using older technology. Exploit the possibilities of operating systems using recent technology.
016R	Install hardware and software on a computer.	962025 962116	Analyze the architecture and operation of computer systems. Install the hardware and software of a computer.
016Y	Plan and manage work activities.	962122	Manage their time.
016U	Research information.	962052	Research information.
016V	Interact and communicate in various work situations.	962074	Interact in various work situations.
0175	Create and use databases.	962106	Create and use a database.
0174	Exploit the possibilities of a networked computing environment.	962148	Manage access to the resources of a network.
0179	Provide technical support and training to users.	962186 962205	Troubleshoot a computer problem. Provide technical support at a telephone help desk.

Students having successfully completed the *Industrial Data Processing* specialization of the *Computer Science Technology* college program may receive credit for the following corresponding competencies of the *Computing Support* secondary school *Computing Support* program, if they continue their studies at the secondary level.

FROM INDUSTRIAL DATA PROCESSING		TO COMPUTING SUPPORT	
CODE	**COMPETENCY**	**SESAME**	**COMPETENCY**
016Q	Exploit the possibilities of an operating system on a specific computer.	962038	Exploit the possibilities of operating systems using older technology.
		962096	Exploit the possibilities of operating systems using recent technology.
016U	Research information.	962052	Research information.
016W	Produce algorithms.	962068	Develop a utility program.
016S	Use a structured programming language.		
016V	Interact and communicate in various work situations.	962074	Interact in various work situations.
016R	Install hardware and software on a computer.	962025	Analyze the architecture and operations of computer systems.
		962116	Install the hardware and software of a computer.
016Y	Plan and manage work activities.	962122	Manage their time.

PART TWO

OBJECTIVES AND STANDARDS - GENERAL EDUCATION COMMON TO ALL PROGRAMS

GENERAL EDUCATION COMMON TO ALL PROGRAMS : LANGUAGE OF INSTRUCTION AND LITERATURE		CODE : 0004
OBJECTIVE		STANDARD
Statement of the competency To analyze and produce various forms of discourse.		
Elements		**Performance criteria**
1 To identify the characteristics and functions of the components of discourse.	1.1	Accurate explanation of the denotation of words.
	1.2	Adequate recognition of the appropriate connotation of words.
	1.3	Accurate definition of the characteristics and function of each component.
2 To determine the organization of facts and arguments of a given discourse.	2.1	Clear and accurate recognition of the main idea and structure.
	2.2	Clear presentation of the strategies employed to develop an argument or thesis.
3 To prepare ideas and strategies for a projected discourse.	3.1	Appropriate identification of topics and ideas.
	3.2	Adequate gathering of pertinent information.
	3.3	Clear formulation of a thesis.
	3.4	Coherent ordering of supporting material.
4 To formulate a discourse.	4.1	Appropriate choice of tone and diction.
	4.2	Correct development of sentences.
	4.3	Clear and coherent development of paragraphs.
	4.4	Formulation of a 750-word discourse.
5 To edit the discourse.	5.1	Thorough revision of form and content.
LEARNING ACTIVITIES		
Discipline : English **Weighting :** 2-2-4, 1-3-4 **Credits :** 2 2/3		

GENERAL EDUCATION COMMON TO ALL PROGRAMS : LANGUAGE OF INSTRUCTION AND LITERATURE		CODE : 0005
OBJECTIVE		STANDARD
Statement of the competency To apply a critical approach to literary genres. **Elements**		**Performance criteria**
1	To distinguish genres of literary discourse.	1.1 Clear recognition of the formal characteristics of a literary genre.
2	To recognize the use of literary conventions within a specific genre.	2.1 Accurate recognition of the figurative communication of meaning. 2.2 Adequate explanation of the effects of significant literary and rhetorical devices.
3	To situate a discourse within its historical and literary period.	3.1 Appropriate recognition of the relationship of a text to its period.
4	To explicate a discourse representative of a literary genre.	4.1 Selective use of appropriate terminology. 4.2 Effective presentation of a 1000-word integrated response to a text.
LEARNING ACTIVITIES		
Discipline : English **Weighting :** 2-2-3 **Credits :** 2 1/3		

GENERAL EDUCATION COMMON TO ALL PROGRAMS : LANGUAGE OF INSTRUCTION AND LITERATURE	CODE : 0006
OBJECTIVE	STANDARD
Statement of the competency To apply a critical approach to a literary theme.	
Elements	**Performance criteria**
1 To recognize the treatment of a theme within a literary text.	1.1 Clear recognition of elements within the text which define and reinforce a theme and its development. 1.2 Adequate demonstration of the effects of significant literary and rhetorical devices.
2 To situate a literary text within its cultural context.	2.1 Appropriate recognition of a text as an expression of cultural context. 2.2 Adequate demonstration of the effects of significant literary and rhetorical devices.
3 To detect the value system inherent in a literary text.	3.1 Appropriate identification of expression (explicit/implicit) of a value system in a text.
4 To explicate a text from a thematic perspective.	4.1 Selective use of an appropriate terminology. 4.2 Effective presentation of a 1000-word integrated response to a text.
LEARNING ACTIVITIES	
Discipline : English **Weighting :** 2-2-3 **Credits :** 2 1/3	

GENERAL EDUCATION COMMON TO ALL PROGRAMS : HUMANITIES	CODE : 00B2
OBJECTIVE	STANDARD
Statement of the competency To apply a logical analytical process to how knowledge is organized and used.	
Elements	**Performance criteria**
1 To recognize the basic elements of a field of knowledge.	1.1 Appropriate description of the basic elements. 1.2 Appropriate use of terminology relevant to fields of knowledge.
2 To define the modes of organization and utilization of a field of knowledge.	2.1 Adequate definition of the dimensions, limits, and uses of fields of knowledge.
3 To situate a field of knowledge within its historical context.	3.1 Accurate identification of the main components in the historical development of fields of knowledge. 3.2 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.	4.1 Coherent organization of the main components.
5 To produce a synthesis of the main components.	5.1 Appropriate analysis of the components. 5.2 Coherent synthesis of the main components. 5.3 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

GENERAL EDUCATION COMMON TO ALL PROGRAMS : HUMANITIES	CODE : 000G
OBJECTIVE	STANDARD
Statement of the competency To apply a critical thought process to world views.	
Elements	**Performance criteria**
1 To describe world views.	1.1 Accurate description of a society or group with a distinctive world view.
	1.2 Appropriate use of terminology relevant to these societies or groups.
2 To explain the major ideas, values, and implications of a world view.	2.1 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.	3.1 Coherent organization of ideas about a world view.
	3.2 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.	4.1 Comparative analysis of these world views.
	4.2 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	

FORMATION GÉNÉRALE COMMUNE : LANGUE SECONDE (NIVEAU I)	CODE : 0017
OBJECTIF	STANDARD
Énoncé de la compétence Appliquer les notions de base de la communication en français courant.	
Éléments	**Critères de performance**
1 Dégager le sens d'un message oral simple.	1.1 Repérage précis des difficultés de compréhension du message.
	1.2 Utilisation pertinente des techniques d'écoute choisies.
	1.3 Distinction précise du sens général et des idées essentielles du message.
	1.4 Description précise du sens général et des idées essentielles du message.
2 Émettre un message oral simple.	2.1 Repérage précis des difficultés d'expression.
	2.2 Utilisation pertinente des techniques d'expression orales choisies.
	2.3 Emploi pertinent du vocabulaire courant.
	2.4 Expression intelligible du propos.
3 Dégager le sens d'un texte.	3.1 Repérage précis des difficultés de compréhension du texte.
	3.2 Utilisation pertinente des techniques de lecture choisies.
	3.3 Distinction claire des principaux éléments du texte.
	3.4 Description précise du sens général et des idées essentielles d'un texte de 500 mots.
4 Rédiger un texte simple.	4.1 Repérage précis des difficultés d'écriture.
	4.2 Utilisation pertinente des techniques d'écriture choisies.
	4.3 Emploi pertinent du vocabulaire courant.
	4.4 Formulation claire et cohérente d'un texte de 100 mots.
LEARNING ACTIVITIES	
Discipline : Français, langue seconde **Pondération :** 2-1-3 **Unités :** 2	

FORMATION GÉNÉRALE COMMUNE : LANGUE SECONDE (NIVEAU II)	CODE : 000A
OBJECTIF	STANDARD
Énoncé de la compétence Communiquer en français avec une certaine aisance.	
Éléments	**Critères de performance**
1 Interpréter un texte oral simple de trois minutes en français courant.	1.1 Distinction claire des principaux éléments du texte oral. 1.2 Explication précise du sens des mots dans le texte. 1.3 Repérage précis des idées et des sujets traités dans le texte.
2 Produire un texte oral planifié de cinq minutes en français courant.	2.1 Emploi pertinent du vocabulaire courant. 2.2 Respect du niveau de langue, du code grammatical et des règles de la prononciation. 2.3 Formulation claire et cohérente du propos.
3 Interpréter un texte écrit en français courant.	3.1 Distinction claire des principaux éléments du texte. 3.2 Explication précise du sens des mots dans le texte. 3.3 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.	4.1 Respect du code grammatical et orthographique. 4.2 Utilisation judicieuse des principaux éléments du corpus. 4.3 Formulation claire et cohérente des phrases. 4.4 Articulation cohérente des paragraphes. 4.5 Rédaction d'un texte de 200 mots.
LEARNING ACTIVITIES	
Discipline : Français, langue seconde **Pondération :** 2-1-3 **Unités :** 2	

FORMATION GÉNÉRALE COMMUNE : LANGUE SECONDE (NIVEAU III)	CODE : 000B
OBJECTIF	STANDARD
Énoncé de la compétence Communiquer avec aisance en français.	
Éléments	**Critères de performance**
1 Produire un texte oral planifié de cinq minutes de complexité moyenne.	1.1 Emploi pertinent du vocabulaire courant. 1.2 Adaptation à l'interlocuteur ou à l'interlocutrice. 1.3 Respect du niveau de langue, du code grammatical et des règles de la prononciation. 1.4 Formulation claire et cohérente du propos. 1.5 Agencement pertinent des idées.
2 Commenter un texte écrit de complexité moyenne.	2.1 Distinction claire des principaux éléments d'un texte comprenant entre 2 500 et 3 000 mots. 2.2 Explication précise du sens des mots dans le texte. 2.3 Distinction précise des idées principales et secondaires, des faits et des opinions. 2.4 Formulation d'éléments implicites.
3 Rédiger un texte de complexité moyenne.	3.1 Respect du code grammatical et orthographique. 3.2 Adaptation au lecteur ou à la lectrice. 3.3 Utilisation judicieuse des principaux éléments du corpus. 3.4 Formulation claire et cohérente des phrases, dont au moins trois sont complexes. 3.5 Articulation cohérente des paragraphes. 3.6 Rédaction d'un texte de 350 mots.
LEARNING ACTIVITIES	
Discipline : Français, langue seconde **Pondération :** 2-1-3 **Unités :** 2	

FORMATION GÉNÉRALE COMMUNE : LANGUE SECONDE (NIVEAU IV)	CODE : 000C
OBJECTIF	STANDARD
Énoncé de la compétence Traiter d'un sujet culturel et littéraire.	
Éléments	**Critères de performance**
1 Analyser un texte culturel ou littéraire.	1.1 Formulation personnelle des éléments principaux du texte. 1.2 Inventaire des thèmes principaux. 1.3 Relevé d'indices qui permettent de situer le texte dans son contexte socioculturel et historique. 1.4 Repérage des valeurs véhiculées. 1.5 Repérage juste de la structure du texte. 1.6 Articulation claire d'un point de vue personnel.
2 Rédiger un texte sur un sujet culturel ou littéraire.	2.1 Respect du sujet. 2.2 Respect du code grammatical et orthographique. 2.3 Adaptation au lecteur ou à la lectrice. 2.4 Utilisation judicieuse des principaux éléments du corpus. 2.5 Formulation claire et cohérente d'un texte de 500 mots. 2.6 Articulation claire d'un point de vue personnel.
LEARNING ACTIVITIES	
Discipline : Français, langue seconde **Pondération :** 3-0-3 **Unités :** 2	

GENERAL EDUCATION COMMON TO ALL PROGRAMS : 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	**Performance criteria**
1 To establish the relationship between one's lifestyle and one's health.	1.1 Proper use of documentation. 1.2 Appropriate relationships between the main lifestyle behaviours and their impact on health.
2 To be physically active in a manner which promotes health.	2.1 Observance of the rules involved in the physical activity, including safety guidelines. 2.2 Respect of one's abilities when practising physical activities.
3 To recognize one's needs, abilities, and motivational factors with respect to being physically active on a regular basis.	3.1 Appropriate use of the physical quantitative and qualitative data. 3.2 Statement of one's main physical needs and abilities. 3.3 Statement of one's main motivational factors with respect to being physically active on a regular basis.
4 To propose physical activities which promote health.	4.1 Appropriate and justified choice of physical activities according to one's needs, abilities, and motivational factors.
LEARNING ACTIVITIES	
Discipline : Physical Education **Weighting** : 1-1-1 **Credits :** 1	

GENERAL EDUCATION COMMON TO ALL PROGRAMS : PHYSICAL EDUCATION CODE : 0065	
OBJECTIVE	STANDARD
Statement of the competency To improve one's effectiveness when practising a physical activity. **Elements** 1 To use a process designed to improve one's effectiveness in the practice of a physical activity.	**Performance criteria** 1.1 Initial assessment of one's abilities and attitudes when practising a physical activity. 1.2 Statement of one's expectations and needs with respect to one's ability to practise the activity. 1.3 Appropriate formulation of personal objectives. 1.4 Statement of the means to achieve one's objectives. 1.5 Observance of the rules involved in the physical activity, including safety guidelines. 1.6 Periodic evaluation of one's abilities and attitudes when practising a physical activity. 1.7 Meaningful interpretation of the progress achieved and the difficulties experienced during the activity. 1.8 Pertinent and periodic adjustments of objectives or action plan. 1.9 Appreciable improvement of the motor skills required by the activity.
LEARNING ACTIVITIES	
Discipline : Physical Education **Weighting :** 0-2-1 **Credits :** 1	

GENERAL EDUCATION COMMON TO ALL PROGRAMS :
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	**Performance criteria**
1 To combine effective practice with a health promotional approach to physical activity.	1.1 Integration of effective practice with factors which promote health in the practice of a physical activity.
2 To manage a personal physical activity program.	2.1 Statement of one's priorities according to the needs abilities, and motivational factors with respect to being active on a regular basis. 2.2 Proper formulation of objectives to achieve in one's personal program. 2.3 Appropriate choice of activity or activities for one's personal program. 2.4 Appropriate planning of how the activity or activities in the personal program are carried out. 2.5 Appropriate choice of criteria to measure program objective attainment. 2.6 Periodic statement of the time invested and the activities carried out during the program. 2.7 Meaningful interpretation of the progress achieved and difficulties experienced during the activity. 2.8 Appropriate and periodic adjustment of objectives or action plan.

LEARNING ACTIVITIES

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

OBJECTIVES AND STANDARDS - GENERAL EDUCATION ADAPTED TO PROGRAMS

GENERAL EDUCATION ADAPTED TO PROGRAMS : 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	**Performance criteria**
1 To identify the forms of discourse appropriate to given fields of study.	1.1 Accurate recognition of specialized vocabulary and conventions.
	1.2 Accurate recognition of the characteristics of the form of discourse.
2 To recognize the discursive frameworks appropriate to given fields of study.	2.1 Clear and accurate recognition of the main ideas and structure.
	2.2 Appropriate distinction between fact and argument
3 To formulate a discourse.	3.1 Appropriate choice of tone and diction.
	3.2 Correctly developed sentences.
	3.3 Clearly and coherently developed paragraphs.
	3.4 Appropriate use of program-related communication strategies.
	3.5 Formulation of a 1000-word discourse.
	3.6 Thorough revision of form and content.

LEARNING ACTIVITIES

Discipline : English
Total Contact Hours : 60
Credits : 2

GENERAL EDUCATION ADAPTED TO PROGRAMS : 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	**Performance criteria**
1 To situate significant ethical issues, in appropriate world views and fields of knowledge.	1.1 Accurate recognition of the basic elements of ethical issues. 1.2 Appropriate use of relevant terminology. 1.3 Adequate identification of the main linkages with world views and fields of knowledge.
2 To explain the major ideas, values, and social implication of ethical issues.	2.1 Adequate description of the salient components of the issues.
3 To organize the ethical questions and their implications into coherent patterns.	3.1 Coherent organization of the ethical questions and their implications. 3.2 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.	4.1 Adequate development of substantiated argumentation including context and diverse points of view. 4.2 Clear articulation of an individual point of view.

LEARNING ACTIVITIES

Discipline : Humanities
Total Contact Hours : 45
Credits : 2

FORMATION GÉNÉRALE PROPRE : LANGUE SECONDE (NIVEAU I)	CODE : 0018
OBJECTIVE	STANDARD
Énoncé de la compétence Appliquer des notions fondamentales de la communication en français, liées à un champ d'études.	
Elements	**Performance criteria**
1 Dégager le sens d'un message oral simple lié à un champ d'études.	1.1 Repérage précis des difficultés de compréhension du message. 1.2 Distinction juste des caractéristiques du message. 1.3 Repérage juste du vocabulaire spécialisé. 1.4 Utilisation pertinente des techniques d'écoute choisies. 1.5 Distinction claire des principaux éléments du message. 1.6 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.	2.1 Repérage précis des difficultés de compréhension du texte. 2.2 Distinction juste des caractéristiques du texte. 2.3 Repérage précis du vocabulaire spécialisé. 2.4 Utilisation pertinente des techniques de lectures choisies. 2.5 Distinction claire des principaux éléments du texte. 2.6 Description précise du sens général et des idées essentielles du texte.
3 Émettre un message oral simple lié à un champ d'études.	3.1 Repérage précis des difficultés d'expression orale. 3.2 Utilisation pertinente des techniques d'expression orale choisies. 3.3 Utilisation pertinente du vocabulaire courant et spécialisé. 3.4 Expression intelligible du propos.
4 Rédiger un court texte lié à un champ d'études.	4.1 Repérage précis des difficultés d'écrire. 4.2 Utilisation pertinente des techniques d'écriture choisies. 4.3 Utilisation pertinente du vocabulaire courant et spécialisé. 4.4 Formulation claire et cohérente du texte.
ACTIVITÉS D'APPRENTISSAGE	
Discipline : Français, langue seconde **Nombre d'heures-contact :** 45 **Nombre d'unités :** 2	

FORMATION GÉNÉRALE PROPRE : LANGUE SECONDE (NIVEAU II)	CODE : 000Q
OBJECTIVE	STANDARD
Énoncé de la compétence Communiquer en français dans un champ d'études particulier.	
Elements	**Performance criteria**
1 Distinguer les types de textes propres au champ d'études.	1.1 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.	2.1 Distinction claire des principaux éléments du texte. 2.2 Interprétation claire du vocabulaire spécialisé. 2.3 Repérage précis des idées et des sujets traités. 2.4 Utilisation pertinente des techniques de lecture et d'écoute.
3 Utiliser des techniques de production de textes appropriées au champ d'études.	3.1 Emploi pertinent du vocabulaire spécialisé et des conventions. 3.2 Respect du niveau de langue et du code grammatical. 3.3 Formulation claire et cohérente du propos. 3.4 Utilisation pertinente des techniques d'expression.

ACTIVITÉS D'APPRENTISSAGE

Discipline : Français, langue seconde
Nombre d'heures-contact : 45
Nombre d'unités : 2

FORMATION GÉNÉRALE PROPRE : LANGUE SECONDE (NIVEAU III)	CODE : 000R
OBJECTIVE	STANDARD
Énoncé de la compétence Communiquer avec aisance en français dans un champ d'études particulier.	
Elements	**Performance criteria**
1 Commenter des textes propres au champ d'études.	1.1 Distinction précise des caractéristiques formelles des principaux types de textes et des conventions utilisées. 1.2 Explication précise du sens des mots dans le texte. 1.3 Repérage précis de la structure du texte. 1.4 Reformulation juste des idées principales et secondaires, des faits et des opinions. 1.5 Emploi juste du vocabulaire spécialisé.
2 Produire un texte sur un sujet lié au champ d'études.	2.1 Respect du sujet. 2.2 Emploi pertinent du vocabulaire spécialisé et des conventions. 2.3 Respect du niveau de langue et du code grammatical. 2.4 Formulation claire et cohérente du propos. 2.5 Agencement pertinent des idées. 2.6 Adéquation entre forme et fond.

ACTIVITÉS D'APPRENTISSAGE

Discipline : Français, langue seconde
Nombre d'heures-contact : 45
Nombre d'unités : 2

FORMATION GÉNÉRALE PROPRE : LANGUE SECONDE (NIVEAU IV)	CODE : 000S
OBJECTIF	STANDARD
Énoncé de la compétence Disserter en français sur un sujet lié au champ d'études.	
Éléments	**Critères de performance**
1 Analyser un texte lié au champ d'études.	1.1 Distinction précise des caractéristiques formelles des types particuliers de textes. 1.2 Formulation personnelle des éléments principaux. 1.3 Inventaire des thèmes principaux. 1.4 Repérage juste de la structure du texte. 1.5 Relevé d'indices qui permettent de situer le texte dans son contexte. 1.6 Articulation claire d'un point de vue personnel, s'il y a lieu. 1.7 Association juste des éléments du texte au sujet traité.
2 Rédiger un texte sur un sujet lié au champ d'études.	2.1 Respect du sujet. 2.2 Emploi pertinent du vocabulaire spécialisé et des conventions. 2.3 Choix judicieux des principaux éléments du corpus en fonction du type de texte. 2.4 Formulation claire et cohérente du texte. 2.5 Respect du code grammatical et orthographique. 2.6 Articulation claire d'un point de vue personnel, s'il y a lieu.
ACTIVITÉS D'APPRENTISSAGE	
Discipline : Français, langue seconde **Nombre d'heures-contact :** 45 **Nombre d'unités :** 2	

OBJECTIVES AND STANDARDS - COMPLEMENTARY GENERAL EDUCATION

COMPLEMENTARY GENERAL EDUCATION: 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** • Students will work alone. • They will write an essay of approximately 750 words on the contribution of the social sciences to an understanding of contemporary issues. • Documents and data from the field of social sciences may be used.
Elements	**Performance criteria**
1 Recognize the focus of one or more of the social sciences and their main approaches.	1.1 Formulation of the focus specific to one or more of the social sciences. 1.2 Description of the main approaches used in the social sciences.
2 Identify some of the issues currently under study in the social sciences.	2.1 Association of 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.	3.1 Presentation of contemporary issues by emphasizing the interpretation of the social sciences. 3.2 Illustration of the interaction between certain social changes and the contribution of the social sciences.

LEARNING ACTIVITIES

Number of student-contact hours : 45
Number of credits : 2

COMPLEMENTARY GENERAL EDUCATION: SOCIAL SCIENCES	CODE: 000W
OBJECTIVE	STANDARD
Statement of the competency To analyze one of the major problems of our time using one or more social scientific approaches.	**Achievement context** • Students will work alone. • They will write an essay of approximately 750 words on a topic related to human existence. • Reference materials from the field of social sciences may be used.
Elements	**Performance criteria**
1 Formulate a problem using one or more social scientific approaches.	1.1 Presentation of the background to the problem. 1.2 Use of appropriate concepts and language. 1.3 Brief description of individual, collective, spatio-temporal and cultural aspects of the problem.
2 Deal with an issue using one or more social scientific approaches.	2.1 Clear formulation of an issue. 2.2 Selection of pertinent reference materials. 2.3 Brief description of historical, experimental and survey methods.
3 Draw conclusions.	3.1 Appropriate use of the selected method. 3.2 Determination of appropriate evaluation criteria. 3.3 Identification of strengths and weaknesses of the conclusions.

LEARNING ACTIVITIES

Number of student-contact hours : 45
Number of credits : 2

COMPLEMENTARY GENERAL EDUCATION: SCIENCE AND TECHNOLOGY	CODE: 000X
OBJECTIVE	STANDARD
Statement of the competency To explain the general nature of science and technology and some of the major contemporary scientific or technological issues.	**Achievement context** • Students will work alone. • They will use a written commentary on a scientific discovery or technological development. • They will write an essay of approximately 750 words.
Elements	**Performance criteria**
1 Describe the standard scientific mode of thought and method.	1.1 Brief description of the essential characteristics of the scientific mode of thought, including quantification and demonstration. 1.2 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.	2.1 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.	3.1 Pertinent and coherent explanation of the relationship between the determining contexts related to several scientific and technological discoveries. 3.2 List of the main stages of scientific and technological discoveries.
4 Deduce different consequences and questions resulting from certain recent scientific and technological developments.	4.1 Brief description of important consequences (of different types) and the current major challenges resulting from several scientific and technological discoveries. 4.2 Formulation of relevant questions and credibility of responses to the questions formulated.
LEARNING ACTIVITIES	
Number of student-contact hours : 45 **Number of credits :** 2	

COMPLEMENTARY GENERAL EDUCATION: SCIENCE AND TECHNOLOGY	CODE: 000Y
OBJECTIVE	STANDARD
Statement of the competency To resolve a simple problem by applying the basic scientific method.	**Achievement context** • Students will work alone or in groups. • They will be given a scientific and technological problem that is not complex and that can be resolved by applying the standard scientific method. • Common scientific instruments and reference materials (written or other) may be used.
Elements	**Performance criteria**
1 Describe the main steps of the standard scientific method.	1.1 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.	2.1 Clear, precise description of the problem. 2.2 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.	3.1 Pertinence, reliability and validity of the experimental method used. 3.2 Observance of established experimental method. 3.3 Appropriate choice and use of instruments. 3.4 Clear, satisfactory presentation of results. 3.5 Validity of the connections established between the hypothesis, the verification and the conclusion.

LEARNING ACTIVITIES

Number of student-contact hours : 45
Number of credits : 2

COMPLEMENTARY GENERAL EDUCATION: MODERN LANGUAGES	CODE: 000Z
OBJECTIVE	STANDARD
Statement of the competency To communicate with limited skill* in a modern language. (*This refers to the limited use of language structures, grammar and vocabulary. This limitation varies depending on the complexity of the modern language.)	**Achievement context** For modern languages that use the Latin alphabet, students will: • have a conversation that includes at least 8 lines of dialogue • write a text consisting of at least 8 sentences For modern languages that use a writing system other than the Latin alphabet, students will: • have a conversation that includes at least 6 lines of dialogue • write a text consisting of at least 6 sentences Students will be exposed to learning situations on familiar themes. Reference materials may be used.
Elements	**Performance criteria**
1 Understand the meaning of a verbal message.	1.1 The acquisition of a modern language requires an awareness of the culture of the people who use the language. 1.2 Accurate identification of words and idiomatic expressions. 1.3 Clear recognition of the general meaning of simple messages. 1.4 Logical connection between the various elements of the message.
2 Understand the meaning of a written message.	2.1 Accurate identification of words and idiomatic expressions. 2.2 Clear recognition of the general meaning of simple messages. 2.3 Logical connection between the various elements of the message.
3 Express a simple message verbally.	3.1 Appropriate use of language structures in main and coordinate clauses. 3.2 Appropriate application of grammar rules. 3.3 Use of verbs in the present indicative. 3.4 Appropriate use of basic vocabulary and idiomatic expressions. 3.5 Understandable pronunciation. 3.6 Coherent sequence of simple sentences. 3.7 Spontaneous and coherent sequence of sentences during a conversation.
4 Write a text on a given subject.	4.1 Appropriate use of language structures in main and coordinate clauses. 4.2 Appropriate application of basic grammar rules. 4.3 Use of verbs in the present indicative. 4.4 Appropriate use of basic vocabulary and idiomatic expressions. 4.5 Coherent sequence of simple sentences. 4.6 Acceptable application of graphic rules for writing systems other than the Latin alphabet.
LEARNING ACTIVITIES	
Number of student-contact hours : 45 **Number of credits :** 2	

COMPLEMENTARY GENERAL EDUCATION: MODERN LANGUAGES	CODE: 0010
OBJECTIVE	STANDARD
Statement of the competency To communicate on familiar topics in a modern language.	**Achievement context** • Students will have a conversation that includes at least 15 lines of dialogue. • They will write a text consisting of at least 20 sentences for Latin-alphabet languages. • They will write a text consisting of at least 10 sentences for languages not using the Latin alphabet. • Students will be exposed to: – common situations in everyday life – simple topics from everyday life • Reference materials may be used.
Elements	**Performance criteria**
1 Understand the meaning of a verbal message.	The acquisition of a modern language requires an awareness of the culture of the people who use the language. 1.1 Accurate identification of words and idiomatic expressions. 1.2 Clear recognition of the general meaning and essential ideas of messages of average complexity. 1.3 Logical connection between the various elements of the message.
2 Understand the meaning of a written message.	2.1 Accurate identification of words and idiomatic expressions. 2.2 Clear recognition of the general meaning and essential ideas of messages of average complexity. 2.3 Logical connection between the various elements of the message.
3 Express a simple message verbally, using sentences of average complexity.	3.1 Appropriate use of language structures in main or subordinate clauses. 3.2 Appropriate application of grammar rules. 3.3 Use of verbs in the present indicative. 3.4 Appropriate use of enriched basic vocabulary and idiomatic expressions. 3.5 Understandable pronunciation. 3.6 Coherent sequence of sentences of average complexity. 3.7 Conversation
4 Write a text on a given subject, using sentences of average complexity.	4.1 Appropriate use of language structures in main or subordinate clauses. 4.2 Appropriate application of grammar rules. 4.3 Use of verbs in the present and past indicative. 4.4 Appropriate use of enriched basic vocabulary and idiomatic expressions. 4.5 Coherent sequence of sentences of average complexity. 4.6 Acceptable application of graphic rules for writing systems other than the Latin alphabet.
LEARNING ACTIVITIES	
Number of student-contact hours : 45 **Number of credits :** 2	

COMPLEMENTARY GENERAL EDUCATION: MODERN LANGUAGES	CODE: 0067
OBJECTIVE	STANDARD
Statement of the competency To communicate with relative ease in a modern language.	**Achievement context** • Students will work alone. • They will have a conversation that includes at least 20 lines of dialogue. • They will write a text of medium length (at least 25 sentences for Latin-alphabet languages and 15 sentences for other languages). • They will use documents of a sociocultural nature. Reference materials for the written text may be used.
Elements	**Performance criteria**
1 Understand the meaning of a verbal message in everyday language.	The acquisition of a modern language requires an awareness of the culture of the people who use the language. 1.1 Accurate explanation of the general meaning and essential ideas of the message. 1.2 Clear identification of structural elements of the language.
2 Understand the meaning of a text of average complexity.	2.1 Accurate explanation of the general meaning and essential ideas of the text. 2.2 Clear identification of structural elements of the language.
3 Have a conversation on a subject.	3.1 Appropriate use of the structural elements of the language according to the message to be expressed. 3.2 Appropriate use of everyday vocabulary. 3.3 Accurate pronunciation and intonation. 3.4 Normal flow in a conversation in everyday language. 3.5 Coherence of the message expressed. 3.6 Pertinent responses to questions.
4 Write a text of average complexity.	4.1 Appropriate use of the structural elements of the language according to the text to be written. 4.2 Accurate vocabulary. 4.3 Coherence of the text as a whole. 4.4 Observance of presentation and writing rules applicable to the text.
LEARNING ACTIVITIES	
Number of student-contact hours : 45 **Number of credits :** 2	

COMPLEMENTARY GENERAL EDUCATION: MATHEMATICS LITERACY AND COMPUTER SCIENCE — CODE: 0011

OBJECTIVE	STANDARD
Statement of the competency To recognize the role of mathematics or informatics in contemporary society.	**Achievement context** • Students will work alone. • They will write an essay of approximately 750 words, using numerous concrete examples that they themselves will have selected.
Elements	**Performance criteria**
1 Demonstrate the acquisition of basic general knowledge of mathematics or informatics.	1.1 Identification of basic notions and concepts. 1.2 Identification of main branches of mathematics or informatics. 1.3 Appropriate use of terminology.
2 Describe the evolution of mathematics or informatics.	2.1 Descriptive summary of several major phases.
3 Recognize the contribution of mathematics or informatics to the development of other areas of knowledge.	3.1 Demonstration of the existence of important contributions, using concrete examples.
4 Illustrate the diversity of mathematical or informatics applications.	4.1 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.	5.1 Identification of several major influences. 5.2 Explanation of the way in which mathematics or informatics have changed certain human and organizational realities. 5.3 Recognition of the advantages and disadvantages of these influences.

LEARNING ACTIVITIES

Number of student-contact hours : 45
Number of credits : 2

COMPLEMENTARY GENERAL EDUCATION: MATHEMATICS LITERACY AND COMPUTER SCIENCE — CODE: 0012

OBJECTIVE	STANDARD
Statement of the competency To use various mathematical or computer concepts, procedures and tools for common tasks.	**Achievement context** • Students will work alone. • They will carry out a task or solve a problem based on everyday needs. • Familiar tools and reference materials may be used.
Elements	**Performance criteria**
1 Demonstrate the acquisition of basic functional knowledge in mathematics or informatics.	1.1 Brief definition of concepts. 1.2 Correct execution of basic operations. 1.3 Appropriate use of terminology.
2 Select mathematical or computer tools and procedures on the basis of specific needs.	2.1 List of numerous possibilities available with mathematical and computer tools and procedures. 2.2 Analysis of concrete situations and recognition of the usefulness of mathematical or computer tools and procedures. 2.3 Appropriate choice according to needs.
3 Use mathematical or computer tools and procedures to carry out tasks and solve problems.	3.1 Planned, methodical process. 3.2 Correct use of tools and procedures. 3.3 Satisfactory results, given the context. 3.4 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.	4.1 Accurate interpretation, given the context. 4.2 Clear, precise formulation of the interpretation.

LEARNING ACTIVITIES

Number of student-contact hours : 45
Number of credits : 2

COMPLEMENTARY GENERAL EDUCATION: ART AND AESTHETICS	CODE: 0013
OBJECTIVE	STANDARD
Statement of the competency To consider various forms of art produced by aesthetic practices.	**Achievement context** • Students will work alone. • They will use a specified work of art and write a commentary of approximately 750 words.
Elements	**Performance criteria**
1 Develop an appreciation for the dynamics of the imagination in art.	1.1 Precise explanation of a creative process connected to the construction of an imaginary universe.
2 Describe art movements.	2.1 Descriptive list of the main characteristics of three art movements from different eras, including a modern movement.
3 Give a commentary on a work of art.	3.1 Coherent organization of observations, including identification of four fundamental 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

Number of student-contact hours : 45
Number of credits : 2

COMPLEMENTARY GENERAL EDUCATION: ART AND AESTHETICS	CODE: 0014
OBJECTIVE	STANDARD
Statement of the competency To produce a work of art.	**Achievement context** • Students will work alone. • of the language and techniques specific to the medium selected.
Elements	**Performance criteria**
1 Recognize the primary forms of expression of an artistic medium.	1.1 Identification of specific features: originality, essential qualities, means of communication, styles, genres.
2 Use the medium.	2.1 Personal, coherent use of elements of language. 2.2 Satisfactory application of artistic techniques. 2.3 Observance of the requirements of the method of production.

LEARNING ACTIVITIES

Number of student-contact hours : 45
Number of credits : 2

OBJECTIVES AND STANDARDS - SPECIFIC PROGRAM COMPONENT

COMMON GENERAL EDUCATION COMPONENT FOR THE SPECIALIZED STREAMS

ADMINISTRATIVE DATA PROCESSING, *INDUSTRIAL DATA PROCESSING* AND *NETWORK MANAGEMENT*

CODE : 016N	
OBJECTIVE	STANDARD
Statement of the Competency Analyze the work functions.	**Achievement Context** • On the basis of recent information about the following occupations: – programmer-analyst in administrative and industrial fields; – computer network manager. • On the basis of recent information about the companies that employ programmer-analysts and network managers.
Elements of the Competency	**Performance Criteria**
1. Describe the work functions and working conditions.	1.1 Pertinence of the information gathered. 1.2 Examination of the general aspects of the occupations and working conditions. 1.3 Identification of computer science opportunities within companies as well as freelance or small-business possibilities. 1.4 Recognition of the effects on the occupations of rapid technological advances in the computer science field.
2. Examine the tasks and operations related to the work functions.	2.1 Examination of the operations, working conditions and performance criteria associated with each occupation. 2.2 Exact determination of the relative importance of the activities. 2.3 Correlation of the steps in the work procedure with the occupational tasks.
3. Examine the skills and behaviours necessary to exercise the work functions.	3.1 Identification of links between the skills, behaviours and various tasks involved in the practise of the occupation. 3.2 Thorough examination of the professional ethics requirements.
4. Examine the regulations relative to the practice of programmer-analysts in all fields.	4.1 Recognition of the rights and responsibilities of individuals in the employer-employee and customer-supplier relationships. 4.2 Recognition of the consequences of violating the laws and regulations.

CODE : 016P	
OBJECTIVE	STANDARD
Statement of the Competency Solve computer-related mathematical and statistical problems.	**Achievement Context** • Based on situations specific to the computer science field. • Using a workstation and a statistics software program. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Carry out computer processing tasks pertaining to the internal data of the computer.	1.1 Representation of numbers in different base systems. 1.2 Conversion of numbers from one base to another. 1.3 Correct execution of arithmetic operations in different bases. 1.4 Proper representation of data in computer memory. 1.5 Accurate interpretation of the limits to data representation in computer memory.
2. Perform logic operations.	2.1 Formulation of propositions appropriate for different situations. 2.2 Construction of a truth table for a proposition. 2.3 Correct simplification of a proposition. 2.4 Proper use of the proof-by-induction method.
3. Organize and process data.	3.1 Construction of sets and subsets for different situations. 3.2 Proper performance of all the operations in the sets. 3.3 Establishment of the proper relations between sets. 3.4 Formulation of appropriate propositions reduced to their simplest forms in order to process the data in a given situation. 3.5 Translation of propositions into set-theory language.

CODE : 016P	
Elements of the Competency	**Performance Criteria**
4. Solve linear programming problems.	4.1 Appropriate representation of a situation as a system of linear equations. 4.2 Correct performance of matrix operations. 4.3 Accurate representation of a system of linear equations in a matrix. 4.4 Application of the correct methods for solving a system of linear equations.
5. Solve enumeration problems.	5.1 Accurate calculation of the number of permutations in a given context. 5.2 Accurate calculation of the number of arrangements in a given context. 5.3 Accurate calculation of the number of combinations in a given context.
6. Solve probability and statistical problems.	6.1 Calculation of event probabilities associated with binomial, normal and Poisson distributions. 6.2 Definition of the proper variables for a given situation. 6.3 Choice of appropriate units of measure for a given situation. 6.4 Choice of appropriate statistical measurements for a given situation. 6.5 Choice of an appropriate data presentation mode. 6.6 Application of standards for tables and graphs. 6.7 Effective use of the features of a statistics software program. 6.8 Choice of appropriate sampling methods for a given situation. 6.9 Interval estimation to find the mean and relative frequency for large samples.

CODE : 016Q	
OBJECTIVE	STANDARD
Statement of the competency Exploit the possibilities of an operating system on a specific computer.	**Achievement Context** • In various operating system environments. • Using a workstation and the appropriate software. • Using appropriate technical reference manuals. • Based on company standards and requirements.
Elements of the competency	**Performance Criteria**
1. Make full use of a file management system.	1.1 Comparison of the features and limitations of the file management systems of different operating systems. 1.2 Correct use of file management commands. 1.3 Correct use of directory management commands. 1.4 Correct use of commands to ensure the security of files and directories. 1.5 Correct use of utilities to store data and ensure its integrity.
2. Automate tasks.	2.1 Thorough analysis of the job performance features and limitations of different operating systems. 2.2 Correct use of the operating system's command language. 2.3 Use of commands to prioritize tasks. 2.4 Adaptation of security measures to task requirements. 2.5 Application of appropriate debugging techniques to the operating system. 2.6 Logging of pertinent comments.
3. Use memory management methods.	3.1 Analysis of the memory management features and limitations of different operating systems. 3.2 Memory allocation appropriate for task performance needs.

CODE : 016Q	
Elements of the competency 4. Customize the computer environment.	**Performance Criteria** 4.1 Comparison of the different types of configuration files specific to the operating system. 4.2 Correct use of the workstation's basic configuration commands. 4.3 Correct use of start-up and peripheral configuration commands. 4.4 Program start-up suited to user's needs. 4.5 Adaptation of the working environment's configuration parameters to the user's requirements. 4.6 Precise logging of customization parameters.

CODE : 016R	
OBJECTIVE	STANDARD
Statement of the Competency Install hardware and software on a computer.	**Achievement Context** • In the lab and at the user's workplace. • Based on a pre-authorized request specifying the type of installation. • Using a workstation. • Working with the hardware and software to be installed and the appropriate utilities. • Based on company standards and requirements. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Analyze the internal architecture of a computer.	1.1 Identification and location of the elements of the motherboard. 1.2 Identification of the features and functions of processors, memories, buses and clocks. 1.3 Identification of the features and functions of the different communication ports. 1.4 Description of the relationships between the different components.
2. Produce an installation plan.	2.1 Careful analysis of the request. 2.2 Preparation of the necessary equipment and materials. 2.3 Correct determination of the sequence of operations.
3. Ensure the security of the workstation and its data.	3.1 Complete record of the initial physical configuration. 3.2 Back-up copy of all the data. 3.3 Application of the appropriate security measures.
4. Install hardware.	4.1 Correct interpretation of the technical specifications. 4.2 Appropriate definition of each installation parameter. 4.3 Installation of the element in the correct location. 4.4 Configuration consistent with the workstation's operating system. 4.5 Appropriate verification to ensure that the element installed functions properly.

CODE : 016R	
Elements of the Competency	**Performance Criteria**
5. Uninstall the hardware components.	5.1 Correct interpretation of technical data. 5.2 Element removed by following the steps of the uninstall process. 5.3 Application of the appropriate security measures.
6. Install software.	6.1 Correct interpretation of technical data. 6.2 Properly launched installation process. 6.3 Choice of installation parameters according to the workstation's operating system. 6.4 Appropriate verification that the software functions properly. 6.5 Software customization according to the user's needs.
7. Uninstall software.	7.1 Back-up copy of the disks. 7.2 Correct interpretation of the technical data. 7.3 Correct use of the utilities to uninstall the software. 7.4 Software removed by following the steps of the manual uninstall process.
8. Verify the functionality of the user's workstation.	8.1 Appropriate verification to ensure that the workstation is functioning properly. 8.2 Effective resolution of installation problems. 8.3 Workstation installed according to ergonomic principles.
9. Log information about the installation.	9.1 Logging of the new configuration. 9.2 Clear and correct records kept on the problems encountered and their solutions. 9.3 Precise inventory update.

CODE : 016S	
OBJECTIVE	STANDARD
Statement of the competency Use a structured programming language.	**Achievement Context** • Using a workstation and the appropriate software. • Using valid algorithms pertinent to the workplace. • Based on the company's standards and requirements. • Using appropriate technical reference manuals for the programming environment.
Elements of the competency	**Performance Criteria**
1. Prepare the programming environment.	1.1 Methodical verification of the access to the environment's various hardware and software elements. 1.2 Environment configured according to the situation's requirements. 1.3 Environment customized to meet the company's requirements.
2. Adapt algorithms to the constraints of the programming language.	2.1 Appropriate modification of data representation. 2.2 Correct adaptation of operating conditions. 2.3 Appropriate modification of the processing structures. 2.4 Appropriate adaptation of the sequence of operations.
3. Translate the algorithms into a programming language.	3.1 Effective use of the environment's editing features. 3.2 Application of the syntactical and semantic rules of the language used. 3.3 Strict application of programming standards. 3.4 Accurate application of the principles of the structured programming language. 3.5 Full and proper use of the language's potential. 3.6 Recording of pertinent comments consistent with company requirements.
4. Compile the program.	4.1 Effective use of the environment's compilation features. 4.2 Detection of compilation errors. 4.3 Correction of compilation errors.

CODE : 016S	
Elements of the competency 5. Test the program.	**Performance Criteria** 5.1 Effective use of the environment's operating system and debugging features. 5.2 Development of tests to verify that the program is functioning properly. 5.3 Correct interpretation of results. 5.4 Appropriate debugging of the program according to the algorithm.

CODE : 016T	
OBJECTIVE	STANDARD
Statement of the competency Use an object-oriented development approach.	**Achievement Context** • Using a workstation and the appropriate software. • Based on situations representative of the workplace and requiring the development of applications involving a limited number of classes. • Based on company standards and requirements. • Using all the documentation available on the applications to be developed. • Using appropriate technical reference manuals.
Elements of the competency	**Performance Criteria**
1. Create an object model.	1.1 Complete definition of the application domains. 1.2 Definition of pertinent classes. 1.3 Definition of appropriate hierarchical relationships between the classes. 1.4 Definition of the services for each of the classes. 1.5 Definition of pertinent attributes based on each class. 1.6 Appropriate graphical representation of the object model.
2. Refine the object model.	2.1 Development of the operational sequence for the different services of the class. 2.2 Appropriate graphical representation of the sequential model. 2.3 Appropriate modification of the object model.

CODE : 016T	
Elements of the competency	**Performance Criteria**
3. Program a class.	3.1 Appropriate preparation of the programming environment. 3.2 Declaration and definition of the class, respecting the syntactical and semantic rules of the language. 3.3 Proper use of the capacities of the language in applying the principles of encapsulation, inheritance and polymorphism. 3.4 Strict application of the company's nomenclature and documentation standards. 3.5 Detection and correction of the class's compilation errors.
4. Ensure that the class functions correctly.	4.1 Development of the tests necessary to verify that all the class services function properly. 4.2 Creation of an appropriate test environment. 4.3 Correct interpretation of the results. 4.4 Appropriate debugging of the class.
5. Generate the executable version of the program.	5.1 Use of generation mechanisms specific to the utility used.

CODE : 016U	
OBJECTIVE	STANDARD
Statement of the competency Research information.	**Achievement Context** • Based on the specific information needs of the workplace. • Based on the information needs associated with technological monitoring. • Based on a work situation and the appropriate software. • Using both French and English reference manuals.
Elements of the competency	**Performance Criteria**
1. Determine and evaluate the need for information.	1.1 Specification of the scope of the required research. 1.2 Definition of the criteria for selecting the research material. 1.3 Demonstration of initiative.
2. Select and use sources of information.	2.1 Judicious selection of sources as a function of the nature and criteria of the research. 2.2 Proper and effective use of conventional and computer-aided methods and research tools. 2.3 Consideration of the risks of deviating from the initial requirements.
3. Consult the sources and extract the necessary information.	3.1 Pertinence of the sources consulted. 3.2 Proper interpretation of French and English documentation. 3.3 Pertinence of the information in relation to the initial requirement. 3.4 Demonstration of curiosity.
4. Record the research results.	4.1 Clarity, precision and pertinence of the recorded information.

CODE : 016V	
OBJECTIVE	STANDARD
Statement of the competency Interact and communicate in various work situations. **Elements of the competency**	**Achievement Context** • In various work situations. • With those individuals involved in a given situation. **Performance Criteria**
1. Establish and maintain interpersonal relationships.	1.1 Consideration of their strengths and weaknesses in interpersonal relationships. 1.2 Demonstration of attitudes conducive to harmonious interpersonal relationships. 1.3 Strict application of the rules of courtesy and politeness. 1.4 Adaptation of their approach to the person and situation. 1.5 Appropriate use of interpersonal conflict-management techniques. 1.6 Demonstration of behaviour consistent with professional ethics.
2. Communicate with individuals both in and outside the company.	2.1 Demonstration of a receptive attitude and a willingness to listen. 2.2 Adaptation of their language level to the person with whom they are speaking. 2.3 Correct use of verbal and non-verbal communication techniques. 2.4 Appropriate use of negotiation and argumentation techniques.
3. Work in a multidisciplinary team.	3.1 Proper identification of the role and responsibilities of the team members. 3.2 Assumption of responsibilities within the team. 3.3 Active contribution to the team's activities. 3.4 Appropriate use of negotiation and argumentation techniques. 3.5 Demonstration of attitudes conducive to teamwork. 3.6 Respect for the team's established working methods. 3.7 Respect for decisions made by the team members. 3.8 Meaningful contribution to the resolution of problems encountered by other team members.

CODE : 016V	
Elements of the competency	**Performance Criteria**
4. Apply a client-based approach.	4.1 Correct interpretation of the customers' needs. 4.2 Demonstration of a constant desire to meet the customers' needs. 4.3 Regular verification to ensure that the customers' needs have been met. 4.4 Appropriate reaction to the customers' problems. 4.5 Demonstration of a constant desire to improve the quality of products and services. 4.6 Demonstration of behaviour consistent with professional ethics.

COMMON OBJECTIVES AND STANDARDS FOR THE SPECIALIZATION STREAMS

ADMINISTRATIVE DATA PROCESSING AND *INDUSTRIAL DATA PROCESSING*

CODE : 016W	
OBJECTIVE	STANDARD
Statement of the Competency Produce algorithms.	**Achievement Context** • Based on situations representative of the workplace • Using a workstation and the appropriate software. • Based on company requirements. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Analyze the situation.	1.1 Correct specification of input data. 1.2 Correct specification of output data. 1.3 Correct specification of the nature of the procedure. 1.4 Correct identification of the conditions for executing the algorithm.
2. Develop the algorithm.	2.1 Choice of a way to represent algorithms that is in accordance with company requirements. 2.2 Definition of a logical sequence of operations. 2.3 Identification of processing structures appropriate for each operation. 2.4 Strict application of syntactical rules for the chosen mode of representation. 2.5 Search for an effective algorithmic solution. 2.6 Precise representation of the chosen algorithmic solution. 2.7 Inclusion of all data necessary to interpret the algorithm.
3. Validate the algorithm.	3.1 Verification of the pertinence of the solution, given the initial situation. 3.2 Identification of the errors and deficiencies of the algorithmic solution developed. 3.3 Appropriate modification of the algorithmic solution.

CODE : 016X	
OBJECTIVE	STANDARD
Statement of the Competency Develop a user interface.	**Achievement Context** • Using a workstation and the appropriate software. • Using various applications requiring the creation of interfaces. • Using appropriate technical reference manuals. • Based on company requirements and data processing standards.
Elements of the Competency	**Performance Criteria**
1. Analyze user characteristics.	1.1 Examination of user characteristics associated with age, culture and education. 1.2 Determination of the users' degree of familiarity with data processing in general and with the application to be used. 1.3 Determination of the users' receptivity to the application to be used. 1.4 Precise identification of the users' expectations.
2. Determine the characeristics of the interaction.	2.1 Recognition of the features of the physical environment. 2.2 Determination of the means of interaction. 2.3 Definition of the characteristics of the interaction tasks. 2.4 Verification of the coherence of means and tasks.
3. Select input and output peripherals.	3.1 Consideration of user characteristics. 3.2 Consideration of the characteristics of the interaction. 3.3 Consideration of ergonomic requirements. 3.4 Consideration of reliability, cost and maintenance constraints. 3.5 Correct interpretation of the manufacturer's specifications for products on the market.

CODE : 016X	
Elements of the Competency	**Performance Criteria**
4. Plan the overall organization of the interface.	4.1 Determination of actions and exceptions related to the tasks. 4.2 Determination of elements in the presentation of actions and exceptions. 4.3 Appropriate spatial organization of the elements. 4.4 Determination of the presentation features of the elements. 4.5 Interface organization satisfying aesthetic and efficiency criteria. 4.6 Recording of the interface configuration.
5. Program the user interface.	5.1 Creation of elements consistent with the selected presentation features. 5.2 Positioning of the elements consistent with the selected spatial organization. 5.3 Establishment of links between the elements and programs of the application. 5.4 Validation of the interface's performance.

CODE : 016Y	
OBJECTIVE	STANDARD
Statement of the Competency Plan and manage work activities.	**Achievement Context** • In work situations representative of the occupation. • Using planning tools. • Based on company requirements.
Elements of the Competency	**Performance Criteria**
1. Analyze the characteristics of the work to be done.	1.1 Correct determination of the principal tasks and their sequence. 1.2 Estimation of the time required to accomplish the principal tasks. 1.3 Consideration of the deadlines for completing the work.
2. Plan activities.	2.1 Determination of the correct priorities. 2.2 Consideration of critical points. 2.3 Provision for extra working time in the event of complications. 2.4 Appropriate use of planning tools and methods. 2.5 Creation of a realistic work schedule. 2.6 Correct evaluation of human and material resources required to complete the work. 2.7 Effective communication with the concerned parties. 2.8 Correct presentation of the work schedule for approval.
3. Follow up work activities.	3.1 Use of an appropriate follow-up method for the activities. 3.2 Efficient time management. 3.3 Adherence to the work schedule. 3.4 Regular adaptation of the work schedule to accommodate unforeseen events.

CODE : 016Z	
OBJECTIVE	STANDARD
Statement of the Competency Produce and manage documentation.	**Achievement Context** • For documents in English and French. • Using a workstation as well as desktop, multimedia and on-line help creation utilities. • Using dictionaries, grammar books and various reference materials. • Using the information highway and telecommunications services. • Based on company requirements.
Elements of the Competency	**Performance Criteria**
1. Choose the publication medium.	1.1 Correct determination of the necessary medium. 1.2 Correct selection and use of document creation software.
2. Produce a technical and administrative document.	2.1 Establishment of an appropriate work schedule for the document to be produced. 2.2 Appropriate preparation of content. 2.3 Strict application of spelling and grammar rules. 2.4 Determination of the correct page layout. 2.5 Use of a language level appropriate for the target audience. 2.6 Textual clarity. 2.7 Proper and efficient use of desktop and multimedia software. 2.8 Adherence to page layout standards.
3. Create an on-line help function.	3.1 Selection of elements that require on-line help. 3.2 Adherence to presentation standards. 3.3 Strict application of spelling and grammar rules. 3.4 Use of a language level appropriate for the target audience. 3.5 Correct use of software for setting up on-line help. 3.6 User friendliness of on-line help function. 3.7 Verification of the coherence of the on-line help topics.

CODE : 016Z	
Elements of the Competency	**Performance Criteria**
4. Produce a training document.	4.1 Consideration of the educational objectives in terms of target audience and training context. 4.2 Appropriate preparation of content. 4.3 Correct use of document production tools. 4.4 Adherence to presentation standards. 4.5 Strict application of spelling and grammar rules. 4.6 Use of a language level appropriate for the target audience. 4.7 Thorough revision of documents.
5. Distribute a document.	5.1 Appropriate determination of a distribution list. 5.2 Selection and use of distribution mode. 5.3 Systematic verification of receipt.
6. File a document.	6.1 Adherence to document storage regulations. 6.2 Attribution of a code consistent with the filing system. 6.3 Assignment of a precise, consistent document title consistent with standards. 6.4 Careful entry of information in the document retrieval system.

OBJECTIVES AND STANDARDS FOR THE SPECIALIZATION STREAM

ADMINISTRATIVE DATA PROCESSING

CODE : 0170	
OBJECTIVE	STANDARD
Statement of the Competency Organize and use data.	**Achievement Context** • For applications (developed or to be developed) that do not have files. • For applications (developed or to be developed) necessitating the creation of files and the use of existing files. • Using a workstation and the appropriate software. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Logically organize data on the available physical support media.	1.1 Analysis of the context in which the data is to be used. 1.2 Comparison of the advantages of the different physical support media. 1.3 Determination of the appropriate physical support media. 1.4 Proper determination of the file access modes.
2. Logically organize data in memory.	2.1 Analysis of the context in which the data is to be used. 2.2 Comparison of the advantages of the different data structures. 2.3 Choice of appropriate data structures. 2.4 Correct creation of stacks, queries, lists, trees and arrays in a programming language. 2.5 Choice of a memory allocation mode appropriate for the data structures.
3. Access data in files.	3.1 Creation and updating of files to support sequential, direct and indexed access. 3.2 Creation and updating of files to support interactive and batch data processing. 3.3 Application of techniques for reorganizing data in memory.
4. Use data in memory.	4.1 Updating of data structures consistent with operations. 4.2 Correct updating of data. 4.3 Memory use consistent with allocation mode. 4.4 Application of techniques for reorganizing data in files.

CODE : 0171	
OBJECTIVE	STANDARD
Statement of the Competency Correct programs.	**Achievement Context** • Using defective programs representative of those found in the workplace. • Using a workstation and the appropriate software. • Based on company requirements. • Using documentation on the programs to be corrected. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Analyze the problem.	1.1 Reproduction of the problem in an appropriate environment replicating the initial conditions. 1.2 Methodical framing of hypothetical solutions. 1.3 Appropriate use of debugging tools to verify hypotheses. 1.4 Identification of the program component producing the problem.
2. Determine the nature of the problem.	2.1 Examination of documentation relevant to the program component. 2.2 Development of pertinent hypotheses on the nature of the problem. 2.3 Proper choice of tests to verify the hypotheses. 2.4 Appropriate use of debugging tools. 2.5 Correct interpretation of the results. 2.6 Deduction of the exact nature of the problem.
3. Correct the problem.	3.1 Effective resolution of difficulties arising from an algorithm formulation of the problem. 3.2 Effective resolution of problems associated with translating the algorithm into the programming language. 3.3 Effective resolution of problems associated with using the programming language.

CODE : 0171	
Elements of the Competency	**Performance Criteria**
4. Validate the solution.	4.1 Analysis of the solution's effect on the program as a whole. 4.2 Preparation of appropriate tests. 4.3 Proper interpretation of results. 4.4 Proper program performance. 4.5 Presentation of the solution to a superior for approval.
5. Make corrections to the documentation.	5.1 Detailed recording of how the problem was resolved.

CODE : 0172	
OBJECTIVE	STANDARD
Statement of the Competency Analyze the features of the information systems of various companies with a view to developing computer-aided solutions.	**Achievement Context** • For companies of various economic sectors that depend on information systems for their activities. • Using documents containing general information about the company. • Using documents describing company procedures. • Using legal statutes concerning the information.
Elements of the Competency	**Performance Criteria**
1. Analyze the general characteristics of the company.	1.1 Examination of the company's mission statement. 1.2 Examination of the type of company structure. 1.3 Examination of the corporate culture.
2. Analyze the company's mode of operations.	2.1 Complete examination of the principal activities of the company's services. 2.2 Proper identification of the role and responsibilities of human resources within the company's different services. 2.3 Complete examination of the methods and tools used in the principal activities. 2.4 Comparison of company practices versus established operating principles. 2.5 Complete examination of the company's operational policies.
3. Analayze the characteristics of the flow of information within the company.	3.1 Categorization of the data associated with the different activities. 3.2 Accurate schematic of how information flows within the company. 3.3 Use of appropriate terminology.
4. Analyze the measures taken by the company in response to legal requirements and internal policies regarding information.	4.1 Examination of measures designed to ensure information confidentiality (access and diffusion) in view of the different services and work functions. 4.2 Examination of the means of storing and arranging information. 4.3 Examination of measures to ensure that copyright is respected. 4.4 Examination of measures to ensure that intellectual property rights are respected.

CODE : 0173	
OBJECTIVE	STANDARD
Statement of the Competency Develop conceptual models using to the structured approach.	**Achievement Context** • Based on various situations representative of the workplace • Based on a functional analysis of a complete application (limited to a few functions). • Using a workstation and CASE software. • Based on company requirements. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1 Model the data.	1.1 Extraction of input and output data consistent with the application in question. 1.2 Identification of pertinent entities and their features. 1.3 Proper standardization of the entities. 1.4 Establishment of proper relationships among the elements. 1.5 Appropriate representation of the entity-relationship model. 1.6 Entry and addition of pertinent elements in the data dictionary. 1.7 Effective use of the data modelling functions of the CASE software.
2 Model the processes.	2.1 Appropriate design of the context diagram. 2.2 Appropriate design of the system diagram. 2.3 Successive and appropriate exploding of the application's functions. 2.4 Determination of processes common to several functions. 2.5 Entry and addition of pertinent elements in the data dictionary. 2.6 Validation of the data flow model. 2.7 Effective use of the modelling functions of the processes of the CASE software.
3 Validate the compatibility of the data models and processes.	3.1 Correct application of the appropriate testing techniques. 3.2 Correct interpretation of the results. 3.3 Appropriate modification of the models.

CODE : 0174	
OBJECTIVE	STANDARD
Statement of the Competency Exploit the possibilities of a networked computing environment.	**Achievement Context** • In various network environments. • Using a workstation and the appropriate software. • Using appropriate hardware, software and utilities. • Based on company standards and requirements. • Based on data processing and telecommunications standards. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Use a network operating system.	1.1 Examination of the features and functions of the network hardware. 1.2 Examination of the features and functions of the network software. 1.3 Examination of the characteristics of network data organization. 1.4 Correct creation of network accounts and user groups. 1.5 Installation of security and protection measures for network accounts and user groups. 1.6 Determination and assignment of access rights and restrictions to network resources. 1.7 Correct automation of the tasks associated with the use of an application.
2. Connect a workstation to the network.	2.1 Proper installation of hardware on the workstation. 2.2 Appropriate definition of configuration parameters for the workstation. 2.3 Proper installation of network access software. 2.4 Testing of the workstation in the network environment.

CODE : 0174	
Elements of the Competency	**Performance Criteria**
3. Analyze the network architecture.	3.1 Examination of the network typology. 3.2 Examination of the methods and data transport protocols associated with transmission mechanisms. 3.3 Examination of the protocols governing the transfer of data between different network nodes. 3.4 Examination of the protocols governing communications between network stations. 3.5 Examination of the data presentation, compression and protection protocols. 3.6 Examination of the protocols associated with the different types of distributed applications.
4. Ensure the exchange of data between compatible network workstations.	4.1 Choice of the appropriate communications protocol. 4.2 Choice of an interaction method appropriate for the nature of the distributed application. 4.3 Proper use of the programming functions associated with the protocols. 4.4 Creation of appropriate support programs for the chosen protocols. 4.5 Test of program performance.

CODE : 0175	
OBJECTIVE	STANDARD
Statement of the Competency Create and use databases.	**Achievement Context** • In environments containing database software and database management systems. • Using a workstation and the appropriate software. • Using applications that are representative of those found in the workplace, and that have a limited number of functions. • Using documentation on the applications, including standardized data models. • Using appropriate technical reference manuals. • Based on company and data processing standards.
Elements of the Competency	**Performance Criteria**
1. Analyze the features of a database.	1.1 Examination of the data model. 1.2 Establishment of the relation between the data model and the database structure. 1.3 Examination of the features of data storage mechanisms. 1.4 Examination of measures to ensure database integrity and security.
2. Analyze the features of a database software program.	2.1 Examination of the system architecture. 2.2 Examination of the system's data storage features. 2.3 Examination of the functions of the system's development tools and utilities. 2.4 Examination of measures to ensure system integrity and security.

CODE : 0175	
Elements of the Competency	**Performance Criteria**
3. Create and exploit a database using database software.	3.1 Proper use of the system's creation functions. 3.2 Proper execution of operations to modify the database structure. 3.3 Proper execution of the data retrieval operations. 3.4 Appropriate creation of different queries and views. 3.5 Examination of the database's integrity rules. 3.6 Application of rules to ensure database security. 3.7 Complete recording of information on the database.
4. Analyze the features of a database management system.	4.1 Examination of the system architecture. 4.2 Examination of the system's different languages. 4.3 Examination of the system's data storage features. 4.4 Examination of the functions of the system's development tools and utilities. 4.5 Examination of measures to ensure database integrity and security.
5. Update a database within a database management system.	5.1 Proper execution of operations to modify the database structure. 5.2 Proper execution of data retrieval operations. 5.3 Proper programming of the different queries and views. 5.4 Proper modification of support programs associated with the application. 5.5 Correct execution of data processing operations in multiuser, multitask and distributed contexts. 5.6 Application of database integrity and security rules. 5.7 Correct use of the system's different languages and development tools. 5.8 Recording, in the appropriate places, of all changes made to the database.

CODE : 0175	
Elements of the Competency 6. Ensure data integrity.	**Performance Criteria** 6.1 Correct application of data protection methods to the physical media. 6.2 Correct application of data protection methods to the database. 6.3 Appropriate use of data recovery techniques following a system failure. 6.4 Verification of the data in the base after recovery.

CODE : 0176	
OBJECTIVE	STANDARD
Statement of the Competency Make functional improvements to an application.	**Achievement Context** • Using applications representative of the workplace, that were developed using structured and goal-oriented programming, and that require the addition or modification of a limited number of functions. • Using a workstation and the appropriate software. • Based on company requirements and standards. • Using all available documentation on each application. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Analyze the features of an application.	1.1 Complete examination of all available documentation on the application. 1.2 Examination of the application's functions and the relationship between them. 1.3 Examination of the application's features in terms of data and programming. 1.4 Complete examination of company requirements.
2. Analyze the nature of the improvements to be made to an application.	2.1 Identification of the functions to be added to the application. 2.2 Identification of the changes to be made to existing functions. 2.3 Verification of the feasibility of making the changes in the application's environment. 2.4 Identifying the repercussions of making the proposed changes to the programs and data.

CODE : 0176	
Elements of the Competency	**Performance Criteria**
3. Add functions to an application and modify them.	3.1 Realistic planning of key activities. 3.2 Development and modification of appropriate algorithms. 3.3 Correct design and modification of appropriate data structures. 3.4 Correct installation of data structures. 3.5 Appropriate conversion of existing data. 3.6 Correct production and modification of the appropriate graphics interfaces. 3.7 Proper programming of new functions. 3.8 Appropriate modification of the programs affected by the changes. 3.9 Proper use of existing resources.
4. Verify the performance of an application.	4.1 In-depth programming test of the new functions and their integration into the application. 4.2 In-depth test of the modified programs and of their performance in the application. 4.3 Complete updating of documentation on the application. 4.4 Presentation of proposals for approval during the development process and at the end of the project.

CODE : 0177	
OBJECTIVE	STANDARD
Statement of the Competency Ensure the quality of an application.	**Achievement Context** • Using a workstation and the appropriate testing software. • Using applications representative of those found in the workplace. • Using applications that employ object-oriented and structured programming techniques. • Based on unit test results. • Based on company requirements and data processing standards. • Based on documentation on each application. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Plan tests.	1.1 Complete analysis of the application's features. 1.2 Complete analysis of the unit test results. 1.3 Establishment of the relationship between the expected quality of the application and the potential demonstrated in the various tests. 1.4 Proposal of an appropriate test sequence. 1.5 Exploration of the possibility of using a test library. 1.6 Appropriate test planning.
2. Run the various tests.	2.1 Creation of appropriate tests for the application. 2.2 Effective use of the test software. 2.3 Correct programming of tests. 2.4 Strict application of integration, integrity and performance testing techniques. 2.5 Proper use of test libraries. 2.6 Perseverance in conducting the tests. 2.7 Adherence to the testing schedule.
3. Verify the quality of the application.	3.1 Interpretation of results in accordance with established quality requirements. 3.2 Recording of all data on the tests and test results. 3.3 Evaluation of the need to redo certain tests and to adapt the testing procedures.

CODE : 0178	
OBJECTIVE	STANDARD
Statement of the Competency Use multimedia processing utilities.	**Achievement Context** • Using a multimedia workstation, graphic software and appropriate utilities. • Using a digitizer. • Using text, sound, image and video files. • Using appropriate technical reference manuals.
Elements of the Competency	**Performance Criteria**
1. Digitize texts, images and sounds.	1.1 Appropriate adjustment of the image resolution and dimension parameters. 1.2 Appropriate adjustment of sound parameters. 1.3 Correct application of the digitizing process. 1.4 Selection of image, sound and text formats consistent with requirements. 1.5 Effective file compression and decompression. 1.6 Effective use of digitizing software and on-line help utilities. 1.7 Appropriate archiving of files in library.
2. Choose and process images.	2.1 Proper choice of images from libraries. 2.2 Effective use of image-quality enhancement features. 2.3 Effective use of image modification, manipulation and assembly features. 2.4 Effective use of colour and texture selection, modification and calibration features. 2.5 Correct importing of images from a library. 2.6 Appropriate archiving of images in a library.

CODE : 0178	
Elements of the Competency	**Performance Criteria**
3. Process sound, image and video files.	3.1 Correct choice of the format for the file to be converted. 3.2 Conversion format in accordance with compatibility requirements. 3.3 Correct application of the conversion procedure. 3.4 Correct use of compression and decompression utilities for sound, image and video files. 3.5 Effective use of on-line help utilities.
4. Create and modify graphics on the screen.	4.1 Examination of the features of the graphics software in vector and bitmap modes. 4.2 Effective use of the features of form creation and modification software. 4.3 Effective use of the colour and texture selection, modification and application features. 4.4 Correct application of drawing techniques. 4.5 Demonstration of creativity and aesthetic sensibility.
5. Capture screens.	5.1 Appropriate configuration of screen-capturing software. 5.2 Effective use of screen-capturing software. 5.3 Insertion and appropriate processing of captured objects.

CODE : 0179	
OBJECTIVE	STANDARD
Statement of the Competency Provide technical support and training to users.	**Achievement Context** • In technical support and training situations representative of the workplace. • In computing environments composed of various hardware and software elements. • Using on-line troubleshooting tools. • Using remote-control software. • Using appropriate means of communication. • Based on company requirements. • Using appropriate technical reference manuals. • In cooperation with key people involved in the project.
Elements of the Competency	**Performance Criteria**
1. Resolve hardware and software problems.	1.1 Use of the appropriate diagnostic method to solve the problem. 1.2 Creation of a precise diagnostic. 1.3 Research and evaluation of possible solutions. 1.4 Choice of the most appropriate solution. 1.5 Strict application of the chosen solution. 1.6 Complete verification of the results in the computing environment. 1.7 Effective use of reference tools. 1.8 Careful recording of the problem and its solution.
2. Provide direct technical support.	2.1 Proper identification of the user's needs. 2.2 Demonstration of empathy. 2.3 Use of language level appropriate for the user. 2.4 Examination of the features of the computing environment. 2.5 Exchange of pertinent ideas with the user. 2.6 Effective resolution of the problem. 2.7 Verification of user satisfaction. 2.8 Appropriate use of remote-control software in accordance with the context. 2.9 Appropriate stress management during the entire operation. 2.10 Strict application of customer approach principles.

CODE : 0179	
Elements of the Competency	**Performance Criteria**
3 Provide indirect technical support.	3.1 Creation of a climate promoting user confidence. 3.2 Use of language level appropriate for the user. 3.3 Evaluation of the features of the computing environment. 3.4 Exchange of pertinent ideas with the user in order to solve the problem. 3.5 Appropriate reconstruction of the problem. 3.6 Formulation of the appropriate solution. 3.7 Detailed transmission of the steps to follow to resolve the problem. 3.8 Verification of the solution's effectiveness. 3.9 Verification of user satisfaction. 3.10 Appropriate stress management during the entire operation.
4. Provide technical support with the assistance of a key person involved in the project.	4.1 Creation of a climate promoting user confidence. 4.2 Use of language level appropriate for the user. 4.3 Identification of the features of the computing environment. 4.4 Exchange of pertinent ideas with the user in order to resolve the problem. 4.5 Consideration of the limits of the operation. 4.6 Choice of the appropriate contact person. 4.7 Transmission of all available data on the problem to the contact person. 4.8 Appropriate follow-up on work progress with the contact person. 4.9 Verification of user satisfaction. 4.10 Effective use of reference tools.

CODE : 0179	
Elements of the Competency 5. Provide training.	**Performance Criteria** 5.1 Identification of elements that must be addressed in the training program. 5.2 Preparation of appropriate training documents. 5.3 Appropriate preparation of training and demonstration environments. 5.4 Correct performance of the planned training activities. 5.5 Regular verification to ensure that the participants have understood. 5.6 Correct evaluation of training.

CODE : 017A	
OBJECTIVE	STANDARD
Statement of the Competency Install an application.	**Achievement Context** • Using a workstation and utility software. • Using appropriate hardware, software and tools. • In various environments. • Using applications representative of the workplace. • Based on company requirements. • Based on documentation on each of the applications. • Using appropriate technical reference manuals. • In conjunction with the network administrator and the installation technician.
Elements of the Competency	**Performance Criteria**
1. Plan the installation.	1.1 Choice of the appropriate installation strategy for the context. 1.2 Evaluation of the human and material resources necessary for the installation. 1.3 Identification of the steps and procedures of the installation. 1.4 Correct anticipation of potential installation problems. 1.5 Creation of a realistic work schedule. 1.6 Effective communication of pertinent information to concerned parties.
2. Configure the environment.	2.1 Strict adherence to the installation plan. 2.2 Adaptation of the hardware environment to the application's requirements. 2.3 Copy of the application and existing data. 2.4 Correct installation and configuration of the application. 2.5 Appropriate data and preparation. 2.6 Application of ergonomic principles.

CODE : 017A	
Elements of the Competency	**Performance Criteria**
3. Validate the quality of the installation.	3.1 Strict execution of application performance tests in the production context. 3.2 Thorough check to ensure that the set of applications perform to their maximum potential in the given environment. 3.3 Copy of the implemented application and its data. 3.4 Effective problem solving. 3.5 Appropriate stress management.
4. Ensure installation follow-up.	4.1 Effective communication of pertinent information to concerned parties. 4.2 Solicitation of comments from users about the application. 4.3 Effective analysis and resolution of problems resulting from the installation.
5. Produce an operations guide for the installation.	5.1 Information on the installations and configurations. 5.2 Presence of pertinent information on the application's production procedures. 5.3 Information on possible problems and their solutions. 5.4 Strict application of composition and presentation rules.

CODE : 017B	
OBJECTIVE	STANDARD
Statement of the Competency Design and develop an application in a database environment.	**Achievement Context** • Using a workstation and the development tools of a database management system. • Based on a request for the development of an application limited to a few functions. • Based on company requirements and data processing standards. • Using appropriate technical reference manuals. • In co-operation with people involved in the development of the application.
Elements of the Competency	**Performance Criteria**
1. Define the functions of the application.	1.1 Determination of the customer's needs. 1.2 Proper use of data collection techniques. 1.3 Complete analysis of the characteristics of activities related to the application to be developed. 1.4 Deduction and justification of the application's functions. 1.5 Global representation of the functions. 1.6 Production of a clear and complete report. 1.7 Application of professional ethics rules. 1.8 Effective communication with all project participants. 1.9 Proposal of creative solutions suited to the customer's needs.

CODE : 017B	
Elements of the Competency	**Performance Criteria**
2. Define the technological requirements.	2.1 Thorough analysis of the characteristics of the data processing and customer environments. 2.2 Identification of the hardware and software required for the development and installation of the application. 2.3 Justification of choices according to priorities and requirements. 2.4 Search for ways to optimize the existing computing environment. 2.5 Search for data processing solutions to meet established needs. 2.6 Proposal of a pertinent plan for bringing the system up to standard. 2.7 Production of a clear and comprehensive report.
3. Lay the groundwork for the application.	3.1 Creation of a realistic work schedule. 3.2 Appropriate use of planning methods and tools. 3.3 Acquisition of the proper environment in which to develop the application.
4. Model the application.	4.1 Appropriate modelling of the data. 4.2 Creation of an appropriate data dictionary. 4.3 Proper modelling of processes. 4.4 Proper modelling of events. 4.5 Proper creation of tables. 4.6 Complete adaptation of the planning schedule. 4.7 Production of clear and comprehensive technical documents.

CODE : 017B	
Elements of the Competency	**Performance Criteria**
5. Produce a user interface using a prototype.	5.1 Effective use of development tools. 5.2 Creation of menus, inputs and outputs consistent with data type and customer needs and requirements. 5.3 Complete validation of interface performance. 5.4 Clear presentation of the user interface for approval. 5.5 Modification of the interface consistent with customer requests. 5.6 Adaptation of algorithms to the user interface. 5.7 Appropriate modification of tables. 5.8 Production of complete documentation on the interface. 5.9 Proper reconciliation of functional and aesthetic requirements.
6. Develop programs.	6.1 Appropriate coding of functions and procedures. 6.2 Proper use of function libraries and procedures specific to the database management system. 6.3 Appropriate programming of modules. 6.4 Optimal use of the programming language. 6.5 Thorough verification of the performance of each program and of the application in the development environment. 6.6 Production and archiving of comprehensive documentation for the programs.
7. Produce documentation for the application.	7.1 Appropriate modification of all data on the application. 7.2 Appropriate creation of an on-line help function. 7.3 Production of a clear and comprehensive user manual for the application.

CODE : 017C	
OBJECTIVE	STANDARD
Statement of the Competency Design and develop an application in a graphics environment.	**Achievement Context** • Based on the general concept of developing an application using the development tools of the operating system available to the programmers. • Using a workstation and the appropriate software. • In various graphics environments. • Based on the standards of the various graphic environments. • Based on data processing standards. • Using appropriate technical reference manuals. • In co-operation with project participants.
Elements of the Competency	**Performance Criteria**
1. Establish the general framework of the application.	1.1 Clarification of the framework in co-operation with project participants. 1.2 Research and analysis of similar products on the market. 1.3 Identification of the application's functional features. 1.4 Identification of the hardware requirements for the application. 1.5 Examination of constraints due to the graphics environment and the development tools. 1.6 Design of the application interface consistent with ergonomic and aesthetic requirements. 1.7 Presentation of the project for approval. 1.8 Effective communication with all project participants.
2. Lay the groundwork for the application.	2.1 Creation of a realistic work schedule. 2.2 Appropriate use of planning methods and tools. 2.3 Acquisition of the proper environment in which to develop the application.

CODE : 017C	
Elements of the Competency	**Performance Criteria**
3. Model the application.	3.1 Appropriate application of a method of analysis. 3.2 Production of proper models in keeping with the chosen method of analysis. 3.3 Production of appropriate technical documents.
4. Program the application.	4.1 Appropriate use of libraries. 4.2 Appropriate programming of model elements. 4.3 Appropriate use of tools to create the elements of the interface. 4.4 Careful verification of application performance. 4.5 Documentation of the programs and archiving of the information.
5. Produce documentation for the application.	5.1 Appropriate modification of all data on the application. 5.2 Appropriate creation of an on-line help function. 5.3 Production of a clear and comprehensive application user manual.

CODE : 017D	
OBJECTIVE	STANDARD
Statement of the Competency Design and develop a hypermedia application within internal and global networks.	**Achievement Context** • Based on situations representative of the workplace. • Using a workstation and the appropriate development tools. • Using internal and global networks. • Based on a needs analysis. • Using appropriate technical reference manuals. • Based on company requirements and data processing standards. • In co-operation with project participants.
Elements of the Competency	**Performance Criteria**
1. Determine the functions of the application.	1.1 Clear identification of the customer's needs. 1.2 Collection of complete information on the number and type of users. 1.3 Collection of complete information on the scope, nature and degree of interactivity of the application. 1.4 Collection of complete information on the data diffusion mode. 1.5 Deduction and justification of the application's functions. 1.6 Production and presentation of a clear and comprehensive report.
2. Determine the technical framework.	2.1 Recognition of factors influencing the choice of technologies. 2.2 Choice of the appropriate architecture. 2.3 Consideration of the possibilities of evolution in technology and the operational context. 2.4 Selection of appropriate hardware and software for the selected architecture. 2.5 Realistic cost estimate. 2.6 Production and presentation of a clear and comprehensive report

CODE : 017D	
Elements of the Competency	**Performance Criteria**
3. Lay the groundwork for the application.	3.1 Creation of a realistic work schedule. 3.2 Appropriate use of planning methods and tools. 3.3 Installation of the chosen software in the development environment. 3.4 Acquisition of the proper environment in which to develop the application.
4. Produce the presentation prototype.	4.1 Effective use of development tools. 4.2 Appropriate establishment of the characteristics of the exploration. 4.3 Correct graphic representation of the screens. 4.4 Identification of the screens' global presentation features. 4.5 Design of the interface consistent with ergonomic and aesthetic requirements. 4.6 Presentation of the prototype for approval.
5. Produce the communications prototype.	5.1 Effective use of development tools. 5.2 Determination of how information travels between different levels. 5.3 Programming of the communications skeleton between the levels, taking account of traffic volume and simultaneous access requests. 5.4 Validation of the communications skeleton. 5.5 Appropriate adaptation of the selected technology.

CODE : 017D	
Elements of the Competency	**Performance Criteria**
6. Develop the application.	6.1 Appropriate programming of the screens. 6.2 Programming of application functions in keeping with company requirements. 6.3 Appropriate database creation and modification. 6.4 Proper programming of database access queries. 6.5 Programming of the integration of different elements in the communications skeleton. 6.6 Thorough verification of the performance of each program and of the application in the development environment. 6.7 Verification and optimization of the application's performance. 6.8 Production and archiving of comprehensive documentation on the programs.
7. Produce documentation related to the application.	7.1 Appropriate modification of all data on the application. 7.2 Appropriate creation of an on-line help function. 7.3 Production of a clear and complete user manual for the application. 7.4 Registration of the site containing the application with the appropriate search engines.

OBJECTIVES AND STANDARDS FOR THE SPECIALIZATION STREAM

INDUSTRIAL DATA PROCESSING

CODE : 017E	
OBJECTIVE	STANDARD
Statement of the Competency Analyze an industrial production environment.	**Achievement Context** • Using a workstation in a production environment. • Using reference documents supplied by the company and by the hardware and software manufacturers. • Using a production system and industrial peripherals. • Based on situations encountered in different sectors of industrial production. • Using industrial software applications and reference documents.
Elements of the Competency	**Performance Criteria**
1. Characterize an industrial production system.	1.1 Proper analysis of the company's organizational structure. 1.2 Complete examination of the steps in the production process. 1.3 Proper interpretation of the relationships between the company's production and data processing systems. 1.4 Appropriate examination of the different standards for each step in the production process. 1.5 Recognition of how important it is to locate the peripherals in areas with optimum environmental conditions. 1.6 Recognition how important it is to select the most effective peripheral control methods.
2. Examine the functions of industrial system hardware.	2.1 Recognition of the different input peripherals and their functions. 2.2 Recognition of the different output peripherals and their functions. 2.3 Recognition of the different types of peripherals associated with production tasks, and recognition of their functions. 2.4 Recognition of the different types of communications ports. 2.5 Proper matching of the peripherals with the different steps in the production process.

CODE : 017E	
Elements of the Competency 3. Examine the software features of an industrial information system.	**Performance Criteria** 3.1 Categorization of the different types of software used in the company. 3.2 Proper choice of software for each phase of the process.

CODE : 017F	
OBJECTIVE	STANDARD
Statement of the Competency Analyze the potential of an industrial peripheral.	**Achievement Context** • Using a workstation in a production environment. • Based on industrial peripherals and their accessories. • Using technical documents supplied by the manufacturer of the peripheral. • Using reference documents for the electric and electronic circuit components. • Respecting company security standards.
Elements of the Competency	**Performance Criteria**
1. Interpret a peripheral manufacturer's instructions.	1.1 Proper interpretation of the units of measure. 1.2 Proper interpretation of the symbols used in the data sheets. 1.3 Demonstration of initiative in clarifying the instructions. 1.4 Good understanding of French and English technical vocabulary. 1.5 Recognition of graphic symbols concerning the safe use of the peripheral. 1.6 Careful examination of the manufacturer's recommendations concerning the optimal environmental conditions for using the peripheral. 1.7 Proper interpretation of the manufacturer's warnings concerning use.
2. Identify the electric and electronic potentials and limitations of an industrial peripheral.	2.1 Recognition and location of the electric and electronic elements of the peripheral. 2.2 Proper analysis of the functions of various electrical elements. 2.3 Proper analysis of the functions of various electronic elements. 2.4 Proper recognition of input and output signals. 2.5 Proper examination of the potential and limitations of the peripheral. 2.6 Functional description of different types of motors.

CODE : 017F	
Elements of the Competency 3. Identify the mechanical, hydraulic and pneumatic potential and limitations of an industrial peripheral.	**Performance Criteria** 3.1 Identification and location of the mechanical, hydraulic and pneumatic elements of the peripheral. 3.2 Proper interpretation of the physical laws governing the transmission of forces. 3.3 Application of techniques to estimate the force and pressure on the pneumatic and hydraulic elements. 3.4 Proper examination of the operational potential and limitations of the peripheral.

CODE : 017G	
OBJECTIVE	STANDARD
Statement of the Competency Organize and store the data of an industrial system.	**Achievement Context** • Using a workstation. • Using appropriate software to create data structures. • Based on functional design specifications. • Using the information highway.
Elements of the Competency	**Performance Criteria**
Interpret functional design specifications.	1.1 Correct interpretation of the context in which the data will be used. 1.2 Selection of the data required to set up data storage features. 1.3 Proper analysis of the data model presented in the design specifications.
2. Plan the work.	2.1 Proper definition of the sequence of operations. 2.2 Realistic evaluation of the time required to complete the work. 2.3 Preparation of a development schedule.
3. Organize the data structure.	3.1 Proper organization of the data structure. 3.2 Use of tests to verify data coherence.
4. Produce a data update interface.	4.1 Production of algorithms to enter, modify and delete data. 4.2 Strict application of modularization techniques. 4.3 Strict application of data validation techniques. 4.4 Interface in keeping with the functional design specifications. 4.5 Verification of data integrity.

CODE : 017H	
OBJECTIVE	STANDARD
Statement of the Competency Create a communications link between an industrial system's hardware and software.	**Achievement Context** • Using a workstation in a production environment. • Using documents supplied by the manufacturer of the industrial peripheral and other technical documentation on modes of communication. • Using industrial peripherals and their accessories as well as communications hardware, software and tools. • Based on organic design specifications. • Based on situations encountered in industry that make it necessary to create or improve a product.
Elements of the Competency	**Performance Criteria**
1. Analyze the performance of an industrial peripheral.	1.1 Proper understanding of the data furnished by the manufacturer. 1.2 Proper analysis of the communications protocol. 1.3 Recognition of the elements of a physical interface.
2. Install and configure an industrial peripheral.	2.1 Choice of an effective architecture for the set-up of the communications system. 2.2 Proper connection of hardware elements. 2.3 Respect for the manufacturer's hardware and software installation procedures. 2.4 Proper verification of the software's compatibility with the operating system. 2.5 Proper communications testing. 2.6 Methodical execution of the test phases proposed by the manufacturer. 2.7 Strict adherence to company security standards.
3. Program the communications interface.	3.1 Creation of an effective algorithm. 3.2 Strict application of modularization techniques. 3.3 Effective use of a protocol library. 3.4 Adaptation of the algorithm consistent with the features of the programming language. 3.5 Effective use of programming techniques.

CODE : 017H	
Elements of the Competency	**Performance Criteria**
4. Verify the communications link between the industrial peripheral and the computer.	4.1 Consideration of the dangers that could arise during testing. 4.2 Use of real-life tests or simulations to verify the performance of the system. 4.3 Correct interpretation of the industrial peripheral's responses to a given command. 4.4 Precise detection of communications errors. 4.5 Appropriate adjustments.
5. Record the installation data.	5.1 Recording of data on the new installation. 5.2 Clear and correct documentation of the applied solutions.

CODE : 017J	
OBJECTIVE	STANDARD
Statement of the Competency Develop a data transfer interface between industrial applications.	**Achievement Context** • Using a workstation in a production environment. • Based on industrial peripherals and their accessories. • Based on the organic design specifications and reference documents supplied by the hardware and software manufacturers. • Based on situations encountered in different industrial environments that require the use of image processing techniques, the programming of industrial peripherals, etc. • Using software that supports CAD/CAM, computer graphics and the instrumentation language of industrial peripherals. • Using appropriate software and reference documents.
Elements of the Competency	**Performance Criteria**
1. Analyze the data format of an application.	1.1 Proper interpretation of the information supplied by the manufacturer of the application. 1.2 Proper recognition of the characteristics of file and memory data formats. 1.3 Appropriate use of the file-reading tools.
2. Program the data transfer interface.	2.1 Selection of pertinent data in terms of the interface to be developed. 2.2 Strict application of modelling rules. 2.3 Precise representation of the architecture of the chosen algorithmic solution. 2.4 Adaptation of the algorithm to the features of the programming language. 2.5 Effective use of programming techniques.
3. Test the interface.	3.1 Verification to ensure that interface elements communicate properly. 3.2 Proper use of debugging tools. 3.3 Appropriate adjustments.

CODE : 017J	
Elements of the Competency 4. Integrate the interface into the system.	**Performance Criteria** 4.1 Respect for the instructions of the integration plan. 4.2 Proper verification of the interrelations with the other system elements. 4.3 Recording of data.

CODE : 017K	
OBJECTIVE	STANDARD
Statement of the Competency Develop an industrial application.	**Achievement Context** • For an industrial application having a limited number of functions. • Using a workstation in a production environment. • Based on industrial peripherals and their accessories. • Based on functional and organic design specifications and reference documents supplied by the manufacturers of the industrial peripherals. • Using appropriate software and reference documents. • Based on situations encountered in different industrial environments that require image processing, the programming of industrial peripherals, the manipulation of industrial data, multitasking and real-time programming, etc.
Elements of the Competency	**Performance Criteria**
1. Interpret functional and organic design specifications.	1.1 Selection of data pertinent to the application to be developed. 1.2 Proper interpretation of the achievement context.
2. Organize the data structure.	2.1 Proper analysis of the data model proposed in the functional design specifications. 2.2 Restructuring of the data model.
3. Produce the algorithms.	3.1 Consideration of the environmental context. 3.2 Strict application of calculation methods. 3.3 Consideration of real-time constraints. 3.4 Strict application of the algorithmic techniques specific to programmable controllers, robotics and image processing. 3.5 Strict application of validation techniques.

CODE : 017K	
Elements of the Competency	**Performance Criteria**
4. Program the application.	4.1 Adaptation of the algorithms to the features of the programming language. 4.2 Proper use of programming principles. 4.3 Effective use of the programming language. 4.4 Proper use of libraries associated with the selected programming language. 4.5 Recording of pertinent comments in keeping with company standards.
5. Test the application.	5.1 Preparation of the environment. 5.2 Methodical application of testing procedures. 5.3 Verification of functional coherence with design specifications. 5.4 Evaluation of test results. 5.5 Strict application of debugging techniques 5.6 Appropriate adjustments.
6. Create an on-line help function.	6.1 Suitability of on-line help for the achievement context and users. 6.2 Selection of the proper elements for documentation. 6.3 Proper location of on-line help calls within the code. 6.4 Concise and easily accessible text.
7. Record the results.	7.1 Recording of pertinent comments in keeping with company standards.

CODE : 017L	
OBJECTIVE	STANDARD
Statement of the Competency Conduct integration and stress tests.	**Achievement Context** • Using a workstation in a production environment. • Using reference documents supplied by the manufacturer of the peripherals. • Based on functional and organic design specifications. • Using a computerized industrial system. • Based on situations encountered in the development of the industrial system. • Using appropriate software and reference documents.
Elements of the Competency	**Performance Criteria**
1. Prepare the elements for testing.	1.1 Proper understanding of functional and organic data. 1.2 Development of test plans in accordance with company standards. 1.3 Preparation of test data in accordance with validation rules and company standards. 1.4 Proper preparation of the test environment.
2. Run the tests.	2.1 Correct and orderly execution of the test phases. 2.2 Proper use of tests. 2.3 Proper verification of data integrity. 2.4 Proper validation of performance in extreme situations. 2.5 Use of real-life tests or simulations to verify the performance of the function with regard to the overall system. 2.6 Appropriate verification of system coherence. 2.7 Appropriate adjustments.
3. Record the results.	3.1 Proper interpretation of results. 3.2 Recording of data pertinent to test procedures and results.

CODE : 017M	
OBJECTIVE	STANDARD
Statement of the Competency Analyze an industrial system.	**Achievement Context** • Using a workstation in a production environment. • Based on industrial peripherals and their accessories. • Using documents produced during different analysis phases. • Using reference documents supplied by the manufacturer of the software and industrial peripherals. • Based on a request describing the nature of the problem encountered or on an expressed need. • Based on situations encountered in different industrial environments. • Using dictionaries, grammar books and reference materials. • Using analysis and desktop software.
Elements of the Competency 1. Do a needs analysis.	**Performance Criteria** 1.1 Accurate description of the current system's performance in its environment. 1.2 Careful preparation of data-collection interviews. 1.3 Creation of solution scenarios that take into account the customer's needs, problems arising from the system, data processing and organizational constraints, feasibility and repercussions. 1.4 Preparation of a complete and realistic schedule for implementing the best solution. 1.5 Production of a complete needs analysis using proper spelling and grammar, in accordance with company standards.

CODE : 017M	
Elements of the Competency	**Performance Criteria**
2. Analyze the functions of an industrial production system.	2.1 Accurate interpretation of the documents produced in preceding phases of analysis. 2.2 Careful preparation of data-collection interviews. 2.3 Correct design and modelling of the data structure, processes and the object-oriented model. 2.4 Proper application of standardization rules. 2.5 Production of a state change diagram. 2.6 Accurate interpretation of the interrelation between the functions of the system analyzed and the functions of the company's other systems. 2.7 Production of a prototype that meets the requirements of the application to be developed. 2.8 Definition of acceptance and performance test criteria. 2.9 Production of complete functional design specifications, using proper spelling and grammar, in accordance with company standards.
3. Choose the appropriate technology.	3.1 Accurate interpretation of the documents produced in preceding phases of analysis. 3.2 Accurate evaluation of the data storage capacity of the system analyzed. 3.3 Accurate evaluation of the frequency with which the analyzed system is used. 3.4 Accurate estimate of the response time required for the station, network and industrial peripherals. 3.5 Inventory of the hardware and software, either on the market or held by the company, that is needed to attain the desired performance levels. 3.6 Recommendation of software and hardware elements that have good cost/benefit ratios.

CODE : 017M	
Elements of the Competency	**Performance Criteria**
4. Write the program specifications.	4.1 Accurate interpretation of the documents produced in preceding phases of analysis. 4.2 Effective function segmentation through the application of modularity and reusability principles. 4.3 Proper adaptation of a conceptual data model consistent with the chosen development tools. 4.4 Accurate application of the inheritance and polymorphism rules for the organization of object classes. 4.5 Proper definition of ergonomic input and output interfaces. 4.6 Creation of an effective, detailed algorithm. 4.7 Production of complete organic design specifications using proper spelling and grammar, in accordance with company standards.
5. Prepare the protocols for the unit, integration, system and acceptance tests.	5.1 Accurate interpretation of the functional design specifications. 5.2 Creation of test objects. 5.3 Creation of tests consistent with the validation rules determined in previous analyses. 5.4 Creation of coherence, integrity, high-traffic, storage capacity and acceptance tests consistent with criteria established in previous analyses.

CODE : 017N	
OBJECTIVE	STANDARD
Statement of the Competency Diagnose and resolve the performance problems of an industrial system.	**Achievement Context** • Using a workstation in a production environment. • Based on industrial peripherals and their accessories. • Using reference documents supplied by the manufacturers of the peripherals. • Using functional and organic design specifications. • Using appropriate software programs and their reference documents. • Based on a request for problems to be resolved. • Based on situations encountered in different production environments. • Using remote control techniques.
Elements of the Competency	**Performance Criteria**
1. Gather information related to the problem to be resolved.	1.1 Accurate interpretation of the initial request. 1.2 Methodical preparation of the data collection procedure. 1.3 Manifestation of ethical behaviour when meeting with users. 1.4 Precise reproduction of the sequence of operations leading to the problem to be resolved.
2. Analyze the information collected.	2.1 Careful analysis of the data obtained. 2.2 Accurate diagnosis of the causes of the problem. 2.3 Extraction of data useful for resolving the problem. 2.4 Evaluation of the scope of the problem.
3. Address the problem.	3.1 Consultation of information produced by the analysis of similar problems. 3.2 Accurate interpretation of the system's technical documents. 3.3 Development of alternative solutions. 3.4 Development of a solution with a minimum impact on the overall system. 3.5 Implementation of the chosen solution. 3.6 Appropriate post-installation follow-up.

CODE : 017N	
Elements of the Competency 4. Record the results.	**Performance Criteria** 4.1 Selection of pertinent data to record. 4.2 Observance of grammar and spelling rules as well as company standards.

CODE : 017P	
OBJECTIVE	STANDARD
Statement of the Competency Develop and deliver an application suite for an industrial system.	**Achievement Context** • Using a workstation in a production environment. • Based on industrial peripherals and their accessories. • Using documents produced in different phases of the analysis. • Using reference documents supplied by the manufacturers of the software and industrial peripherals. • Based on situations encountered in different industrial environments. • Using appropriate software programs and their reference documents.
Elements of the Competency	**Performance Criteria**
1. Consult documentation on the analysis of the system.	1.1 Accurate interpretation of functional and organic data. 1.2 Degree of precision of the mandate.
2. Plan the system development and integration.	2.1 Development of a work strategy. 2.2 Preparation of a realistic schedule. 2.3 Accurate evaluation of the hardware and software needed to develop and integrate the system. 2.4 Careful verification of materials received.
3. Develop a set of applications for a system.	3.1 Identification of the elements required to develop the function. 3.2 Proper creation of data structures. 3.3 Accurate translation of the algorithms into the chosen language. 3.4 Effective use of development methods and tools. 3.5 Respect for programming rules and company standards. 3.6 Verification of data integrity, application coherence and process synchronization.

CODE : 017P	
Elements of the Competency	**Performance Criteria**
4. Integrate a system.	4.1 Appropriate preparation of the physical environment. 4.2 Methodical application of integration procedures. 4.3 Effective integration of the system's application suite.
5. Verify system performance.	5.1 Appropriate preparation of the test environment. 5.2 Application of a test protocol defined in the analysis documents. 5.3 Accurate interpretation of test results. 5.4 Appropriate modifications based on test results, in order to obtain the desired level of performance. 5.5 Proper presentation of test results for approval.
6. Produce a technical manual.	6.1 Selection of elements pertinent to the description of the system's performance. 6.2 Production of document consistent with company standards. 6.3 Proper filing of documentation. 6.4 Textual clarity and precision.

OBJECTIVES AND STANDARDS FOR THE SPECIALIZATION STREAM

NETWORK MANAGEMENT

CODE : 017Q	
OBJECTIVE	STANDARD
Statement of the Competency Use an algorithmic approach.	**Achievement Context** • Based on various situations representative of the workplace. • With a view to resolving problems and making improvements.
Elements of the Competency	**Performance Criteria**
1. Analyze the situation.	1.1 Accurate establishment of the initial elements. 1.2 Accurate establishment of the desired results. 1.3 Accurate establishment of the nature of the operations. 1.4 Accurate evaluation of the working conditions in which the task is to be performed.
2. Develop an algorithmic solution.	2.1 Choice of the appropriate method of representing algorithms. 2.2 Identification of a logical sequence of operations. 2.3 Identification of the appropriate actions for each operation. 2.4 Strict application of the standards for each of the chosen methods of representation. 2.5 Choice of an effective algorithmic solution. 2.6 Precise representation of the selected algorithmic solution. 2.7 Inclusion of all data necessary to interpret the algorithmic solution.
3. Validate the algorithmic solution.	3.1 Verification of the developed solution's relevance to the initial situation. 3.2 Identification of the algorithmic solution's weaknesses and deficiencies. 3.3 Appropriate modification of the algorithmic solution.

CODE : 017R	
OBJECTIVE	STANDARD
Statement of the Competency Analyze the architecture of a computer network.	**Achievement Context** • Based on a request concerning network evolution or migration. • Using a network diagram. • Using appropriate technical reference documents. • In various computing environments.
Elements of the Competency	**Performance Criteria**
1. Analyze the network topology.	1.1 Accurate identification of network nodes and their associated services. 1.2 Accurate evaluation of the installed hardware and software. 1.3 Map of the possible paths by which data could flow between departments and workstations. 1.4 Accurate identification of the communications protocols used.
2. Identify the particularities of the existing links.	2.1 Accurate identification of each type of link. 2.2 Accurate identification of the operational possibilities of each type of link. 2.3 Accurate identification of the operational constraints of each type of link.
3. Analyze the network's linkage possibilities.	3.1 Listing of the services available in a given context that should be linked. 3.2 Accurate identification of the communications protocols to be implemented. 3.3 Accurate identification of the hardware and software needed, in keeping with the type of link and the characteristics of the environment.

CODE : 017S	
OBJECTIVE	STANDARD
Statement of the Competency Choose hardware.	**Achievement Context** • Based on a request. • Using a workstation and the appropriate software. • Based on company standards. • Based on the budget allocated. • Consulting external sources. • Using pertinent technical reference documents. • Using a line of products and a test environment.
Elements of the Competency	**Performance Criteria**
1. Analyze the request and the users' computing environment.	1.1 Accurate interpretation of the request. 1.2 Identification of the need behind the request. 1.3 Accurate and detailed analysis of the features of the computing environment. 1.4 Pertinence of collecting complementary data.
2. Research and analyze the different products available.	2.1 Use of appropriate research methods and tools. 2.2 Pertinence of the products to be analyzed in terms of current standards. 2.3 Accurate analysis of the products in terms of the request and the computing environment.
3. Run compatibility tests.	3.1 Appropriate selection and installation of the elements to be tested, according to the particular features of the computing environment. 3.2 Accurate identification of the tests to be conducted. 3.3 Correct execution of each test. 3.4 Accurate and critical analysis of test results. 3.5 Accurate logging of all test results.
4. Verify that correct choices were made.	4.1 Appropriateness of each element chosen, based on the request, the test results and the budget allocated. 4.2 Respect for company standards.

CODE : 017T	
OBJECTIVE	STANDARD
Statement of the Competency Optimize the functionalities of an operating system on a computer.	**Achievement Context** • Based on a request for optimization. • Using a workstation and the appropriate software. • Based on company standards. • Using technical reference documents. • In various computing environments.
Elements of the Competency	**Performance Criteria**
1. Analyze the possibility of optimizing configuration files.	1.1 Accurate interpretation of the instructions for the various files. 1.2 Accurate identification of the instructions to be optimized, as per the request. 1.3 Proper understanding of the results expected for each instruction to be carried out.
2. Modify the contents of configuration files.	2.1 Accurate identification of the nature of the modifications to be made, according to the request. 2.2 Adaptation of the instructions consistent with the nature of the modifications to be made. 2.3 Comparison of expected and actual results.
3. Store the changes made to the configuration files.	3.1 Methodical and precise recording of all modifications made.

CODE : 017U	
OBJECTIVE	STANDARD
Statement of the Competency Ensure the security of a computer network's hardware and software.	**Achievement Context** • Based on policies governing back-up copies. • Using a workstation and the appropriate software. • Based on company security standards. • Using the technical specifications for the various hardware and software protection systems. • Using the necessary equipment and material.
Elements of the Competency	**Performance Criteria**
1. Determine the ways in which the integrity of computer data could be compromised.	1.1 Accurate evaluation of the risk that someone might access the premises. 1.2 Accurate evaluation of the risks associated with natural factors and system failures. 1.3 Accurate evaluation of the risk that someone might access the network. 1.4 Anticipation of other potential risks and their sources.
2. Establish data protection measures.	2.1 Installation of appropriate measures to restrict physical access to the workstations. 2.2 Installation of measures to guard against natural elements and system failures. 2.3 Installation of measures to control internal and external access to the network. 2.4 Respect for company security standards.

CODE : 017U	
Elements of the Competency	**Performance Criteria**
3. Implement data protection measures.	3.1 Appropriate installation of equipment to guard against interruptions. 3.2 Creation of a list of information that must be protected by security measures. 3.3 Installation of information protection measures. 3.4 Creation of a user access list. 3.5 Correct determination and assignment of access rights to users. 3.6 Proper installation of preventive maintenance measures.
4. Ensure that data is stored correctly.	4.1 Accurate identification of information to be backed up. 4.2 Adherence to the verification procedure preceding the back-up process. 4.3 Strict application of the data back-up procedure. 4.4 Accurate evaluation of the results of the back-up procedure. 4.5 Effective resolution of back-up problems. 4.6 Methodical and precise logging of the results of the back-up procedure.
5. Ensure the validity of the implemented measures.	5.1 Accurate and complete definition of the data security policy. 5.2 Installation of an appropriate data recovery plan. 5.3 Integrity of initial data after recovery. 5.4 Appropriate follow-up of data access and protection measures.

CODE : 017V	
OBJECTIVE	STANDARD
Statement of the Competency Manage a computer population.	**Achievement Context** • Based on a group of workstations containing a variety of equipment. • Based on pre-existing data on the equipment and materials. • Based on the company's operating procedures and established budget. • Using a workstation and the appropriate software. • Using the necessary documents: proposal, order, warranty, service contract, etc. • Using conventional and computer-aided methods of storing data.
Elements of the Competency	**Performance Criteria**
1. Prepare and update a computer equipment inventory.	1.1 Creation of a complete list of workstations. 1.2 Creation of a precise, complete and detailed list of equipment (hardware and software) for each workstation. 1.3 Creation of a precise, complete and detailed list of equipment (hardware and software) for the group of workstations. 1.4 Proper and timely updating of the inventory list. 1.5 Proper use of an inventory management software program.
2. Manage the equipment reserve (hardware and software).	2.1 Accurate evaluation of the nature and quantity of equipment to keep in reserve, based on the need and frequency of replacement. 2.2 Accurate estimate of equipment to be ordered. 2.3 Correct application of merchandise purchase and receiving processes. 2.4 Organization of storage area, and ease of access to equipment.

CODE : 017V	
Elements of the Competency	**Performance Criteria**
3. Manage the budget for a computer population.	3.1 Accurate analysis of equipment purchase requests in relation to available funds. 3.2 Careful tracking of budget. 3.3 Respect for company operating procedures.
4. Follow up purchase and service contracts.	4.1 Accurate interpretation of the clauses of the various contracts. 4.2 Consideration of the warranty periods for purchases and for equipment repairs (hardware and software). 4.3 Pertinence of the service requests made to suppliers as a part of maintenance contracts.

CODE : 017W	
OBJECTIVE	STANDARD
Statement of the Competency Manage a computer network.	**Achievement Context** • Using a server, a workstation and the appropriate software. • Based on company standards. • Using analysis and monitoring utilities. • Using procedure handbooks and technical manuals. • Taking into account the list of events.
Elements of the Competency	**Performance Criteria**
1. Choose and use analysis and monitoring utilities.	1.1 Selection of the appropriate tool for the analysis or monitoring need. 1.2 Proper use of analysis and monitoring utilities. 1.3 Recognition of the nature of the data furnished by the utility.
2. Read and understand the indicator values.	2.1 Correct reading of numeric and graphic values. 2.2 Accurate reading of the value of each indicator. 2.3 Correct detection of differences in values. 2.4 Correct detection of performance irregularities. 2.5 Demonstration of keen observation skills.
3. Implement a procedure.	3.1 Rapid selection of the proper procedure to be implemented. 3.2 Appropriate adaptation of an existing procedure. 3.3 Relevance and accuracy of recommendations. 3.4 Correct implementation of the selected procedure. 3.5 Careful verification of the results obtained. 3.6 Methodical, precise and complete logging of information.
4. Establish and document a new procedure.	4.1 Pertinence of establishing a new procedure. 4.2 Correct definition of the new procedure in terms of supervision requirements. 4.3 Thoroughness and accuracy of the new procedure.

CODE : 017X	
OBJECTIVE	STANDARD
Statement of the Competency Choose software.	**Achievement Context** • Based on various requests. • Using a workstation in its computing environment. • Based on company standards. • Based on the budget allocated. • Consulting with key resource people. • Using different sources of information. • Using a line of software and a test environment.
Elements of the Competency	**Performance Criteria**
1. Analyze the request and the user's computing environment.	1.1 Accurate interpretation and clarification of the request. 1.2 Accurate and detailed analysis of the features of the computing environment. 1.3 Pertinence of collecting complementary data.
2. Research and analyze the different software programs available.	2.1 Use of appropriate research methods and tools. 2.2 Pertinence of the products to be analyzed in terms of company standards. 2.3 Accurate analysis of the software in terms of the request and the computing environment.
3. Run compatibility tests.	3.1 Selection of software to be tested according to the particular features of the computing environment and compatibility with the software already in use. 3.2 Accurate identification of the tests to be performed and their sequence. 3.3 Correct execution of each test. 3.4 Accurate and critical analysis of test results. 3.5 Accurate logging of all results.
4. Ensure that correct choices were made.	4.1 Choice of software consistent with the particularities of the request, the test results and the budget allocated. 4.2 Respect for company standards.

CODE : 017Y	
OBJECTIVE	STANDARD
Statement of the Competency Manage their time and ensure the quality of their work.	**Achievement Context** • In various work situations. • Based on tasks to be performed. • Using a workstation. • Based on company standards. • Using pertinent software and documents. • Using appropriate equipment and materials.
Elements of the Competency	**Performance Criteria**
1. Establish a work plan.	1.1 Accurate interpretation of the nature of the work to be performed. 1.2 Appropriate verification of the availability of necessary resources. 1.3 Choice of the proper time to perform the work. 1.4 Determination of a logical sequence in which to perform the steps. 1.5 Development and proper use of planning tools.
2. Manage documents.	2.1 Logical and structured assembly of both conventional and electronic documents. 2.2 Systematic update of stored information. 2.3 Document storage at the proper times and locations.
3. Evaluate and improve the quality of the work.	3.1 Choice of evaluation tools consistent with the objective. 3.2 Correct use of chosen tools. 3.3 Correct adaptation of evaluation tools to the nature of the work. 3.4 Proper evaluation of the work methods used. 3.5 Determination of means to improve work efficiency. 3.6 Consideration of standards pertinent to evaluating the quality of their work.
4. Write quality standards.	4.1 Pertinence of drafting standards to satisfy the company's need for efficiency and standardization. 4.2 Production of clear and precise standards.

CODE : 017Z	
OBJECTIVE	STANDARD
Statement of the Competency Provide technical support to network users.	**Achievement Context** • Based on verbal and written requests. • Using a workstation and the appropriate software. • Based on company standards. • Using conventional and computer-aided communications tools. • With network users.
Elements of the Competency	**Performance Criteria**
1. Receive and analyze requests.	1.1 Willingness to listen and receptive attitude. 1.2 Proper analysis of the nature and complexity of the request. 1.3 Proper identification of the needs to be met and the steps to be taken. 1.4 Valid reasons for delays in providing support. 1.5 Proper request prioritization.
2. Provide users with information on network use.	2.1 Correct and clear information on company policy, as well as on the applications available on the network and their utility. 2.2 Proper popularization of the information. 2.3 Good oral and written communications skills. 2.4 Correct use of different communications tools. 2.5 Demonstration of patience.
3. Prepare and give training sessions.	3.1 Accurate identification of information needs. 3.2 Selection of training course content consistent with users' needs. 3.3 Clear and organized presentation of course content. 3.4 Use of varied and dynamic pedagogical techniques to solicit the participants' interest. 3.5 Demonstration of assurance and self-confidence. 3.6 Quality of oral and written expression. 3.7 Systematic verification to ensure that the participants have understood the information transmitted. 3.8 Proper evaluation of the quality of the training offered.

CODE : 017Z	
Elements of the Competency	**Performance Criteria**
4. Provide technical support for software and network functions.	4.1 Pertinence, clarity and precision of the explanations given. 4.2 Correct use, in a support context, of support applications as well as software to meet the particular needs of the company. 4.3 Suggestion of pertinent means of optimizing software use. 4.4 Correct application of the customer approach. 4.5 Demonstration of availability. 4.6 Demonstration of a concern that network users respect the company's operating standards.
5. Log data on the technical support provided.	5.1 Proper recording of the nature of the support provided and the results obtained. 5.2 Clarity and precision of recorded information.

CODE : 0180	
OBJECTIVE	STANDARD
Statement of the Competency Ensure the evolution of the computer network.	**Achievement Context** • Using a server, a workstation and appropriate software. • Based on various requests for major and minor modifications. • Based on the budget allocated. • Based on company standards. • Based on a network diagram. • Using the hardware and software to be installed and the appropriate tools. • Using appropriate technical documents.
Elements of the Competency	**Performance Criteria**
1. Analyze the request.	1.1 Proper clarification of the request. 1.2 Accurate evaluation of the nature and scope of the needs to be met.
2. Determine the changes to be made to the network.	2.1 Demonstration of openness to new technologies. 2.2 Consideration of the particular features of the network architecture. 2.3 Determination of different plausible scenarios. 2.4 Choice of scenarios most likely to satisfy the need for system evolution while respecting budgetary limits. 2.5 Proper evaluation of the effects produced by the chosen scenario. 2.6 Pertinence of consultations with the parties involved. 2.7 Demonstration of an ability to make decisions independently.
3. Establish a work plan.	3.1 Accurate identification of the sequence of operations. 3.2 Pertinence of information transmitted to users about possible malfunctions in network performance.

CODE : 0180	
Elements of the Competency	**Performance Criteria**
4. Install hardware and software on the network.	4.1 Proper preparation of the necessary materials. 4.2 Strict protection of all data on the network. 4.3 Accurate interpretation of technical information for each element. 4.4 Appropriate definition of each configuration parameter. 4.5 Appropriate installation of each element.
5. Run tests.	5.1 Creation of an appropriate test environment. 5.2 Proper performance of operational tests for the new element. 5.3 Identification of negative effects of the new installation on the network. 5.4 Pertinence of actions taken to correct the negative effects. 5.5 Proper and critical comparison of actual and expected results.
6. Log data on changes.	6.1 Proper, precise and complete recording of information. 6.2 Updating of the network diagram.

CODE : 0181	
OBJECTIVE	STANDARD
Statement of the Competency Develop utilities.	**Achievement Context** • Based on various repetitive tasks. • Using a workstation and the appropriate software. • Based on company standards. • Using pertinent reference documents.
Elements of the Competency	**Performance Criteria**
1. Point out the need to develop utilities.	1.1 Pertinence of the expressed need, according to the frequency with which the tasks are performed. 1.2 Consideration of the level of complexity involved in developing the tool needed for the task. 1.3 Demonstration of a desire to improve the efficiency of one's work.
2. Develop an algorithmic solution.	2.1 Proper identification of the elements to be used in developing the utility. 2.2 Creation of a precise and structured algorithmic solution to the expressed need.
3. Choose the method and the tool to be used in developing the utility.	3.1 Choice of a programming method consistent with the need expressed. 3.2 Choice of a programming language consistent with the chosen method, need and language availability. 3.3 Consideration of the languages used within the company.
4. Translate the algorithmic solution into the chosen programming language.	4.1 Correct coding of the operations in the chosen programming language. 4.2 Application of proper syntax and semantic rules for the language used. 4.3 Strict application of programming standards. 4.4 Effective use of the language. 4.5 Recording of pertinent comments consistent with company standards.

CODE : 0181	
Elements of the Competency	**Performance Criteria**
5. Test and correct the utility.	5.1 Location and correction of compilation errors. 5.2 Correct preparation of tests necessary to verify the utility's effectiveness. 5.3 Proper interpretation of test results. 5.4 Appropriate debugging of the program according to the chosen algorithmic solution.
6. Produce documentation for the utility developed.	6.1 Methodical, precise and complete recording of the need fulfilled by the utility and the approach used. 6.2 Methodical, precise and complete documentation of how the utility is to be used.

CODE : 0182	
OBJECTIVE	STANDARD
Statement of the Competency Diagnose and resolve network problems.	**Achievement Context** • Based on various user requests. • Using a workstation and the appropriate software. • Using the company's inventory of problems and their solutions. • Using pertinent reference documents. • In co-operation with resource people from within the company and without.
Elements of the Competency	**Performance Criteria**
1. Analyze the requests.	1.1 Proper interpretation of requests. 1.2 Collection of complementary data to clarify the nature of the problem. 1.3 Logical prioritization consistent with the urgency of the requests and negative consequences for the company. 1.4 Effective communication.
2. Determine the causes and possible solutions.	2.1 Accurate identification of possible causes. 2.2 Choice of diagnostic tools consistent with the problem. 2.3 Correct use of selected diagnostic tools. 2.4 Correct performance of operations to determine the principal cause of the problem. 2.5 Identification of alternative solutions to the problem.
3. Identify and apply the solution.	3.1 Critical analysis of the solutions in terms of the principal cause. 3.2 Pertinence of consultations with key resource people. 3.3 Correct choice of the solution to apply. 3.4 Accurate definition of the sequence of the operations to be performed. 3.5 Application of the solution consistent with pre-defined operations.
4. Record information on the steps taken.	4.1 Precise recording of the problems expressed and their solutions. 4.2 Use of appropriate terminology.

CODE : 0183	
OBJECTIVE	STANDARD
Statement of the Competency Set up a server.	**Achievement Context** • Using a computer. • Based on various requests and computing environments. • Using a workstation and the appropriate software. • Based on company standards. • Using a network diagram. • Using software to be installed. • Using pertinent technical reference documents.
Elements of the Competency	**Performance Criteria**
1. Analyze the request.	1.1 Proper analysis of the purpose and complexity of the request. 1.2 Proper identification of the nature of the services to be provided. 1.3 Proper identification of the steps to be taken.
2. Choose and install a network operating system.	2.1 Choice of a system consistent with the request, the characteristics of the computing environment and the company standards. 2.2 Accurate interpretation of technical information. 2.3 Correct installation of the system on the computer. 2.4 Configuration of the system consistent with the request and the characteristics of the computing environment.
3. Install software on the network.	3.1 Accurate interpretation of the technical information for the different software. 3.2 Proper application of the appropriate installation procedure. 3.3 Correct configuration of software applications and services on the server.
4. Create user accounts.	4.1 Correct application of user-account creation procedures. 4.2 Correct assignment of network access and user rights. 4.3 Strict respect for company standards.

CODE : 0183	
Elements of the Competency	**Performance Criteria**
5. Verify the effectiveness of the installation.	5.1 Appropriate verification of the effectiveness of the installed elements. 5.2 Effective resolution of the installation problems encountered.
6. Record information about the configuration.	6.1 Accurate, precise and complete recording of information. 6.2 Precise updating of the inventory and network diagram.

CODE : 0184	
OBJECTIVE	STANDARD
Statement of the Competency Set up Internet-related technologies and services.	**Achievement Context** • Based on various requests and computing environments. • Using a workstation and the appropriate software. • Using an Internet link. • Based on company standards. • In conjunction with external resource people. • Using a network diagram. • Using pertinent technical reference documents.
Elements of the Competency	**Performance Criteria**
1. Analyze the request.	1.1 Appropriate clarification of the object and the complexity of the request. 1.2 Selection of Internet technologies consistent with users' needs. 1.3 Complete and critical analysis of the repercussions of a new installation on the network. 1.4 Accurate identification of security measures to be implemented. 1.5 Consistency of recommendations with analysis results. 1.6 Identification of the proper steps to be taken.
2. Connect the local network to the Internet.	2.1 Identification of the proper log-on addresses on an address page. 2.2 Correct installation of hardware and software to support connection. 2.3 Correct installation of elements to ensure network security. 2.4 Configuration of hardware and software consistent with the particularities of the computing environment. 2.5 Strict application of company policies governing Internet use. 2.6 Appropriate verification of the quality of the Internet connection.

CODE : 0184	
Elements of the Competency	**Performance Criteria**
3. Support the use of Internet services and Intranet- and Extranet-based applications.	3.1 Proper selection of the software required to use the services, according to network type. 3.2 Correct installation of the chosen software. 3.3 Correct configuration of the software installed. 3.4 Strict application of proper security measures for the network used. 3.5 Careful verification of the effectiveness of the services requested.
4. Record information on the configuration.	4.1 Accurate, precise and complete recording of pertinent information on the installation. 4.2 Precise updating of the network architecture diagram.

CODE : 0185	
OBJECTIVE	STANDARD
Statement of the Competency Plan the installation of a computer network.	**Achievement Context** • Based on company needs. • Based on company standards. • Based on a budget allocated for the installation. • In conjunction with external resource people. • Using pertinent technical reference documents.
Elements of the Competency	**Performance Criteria**
1. Analyze the need for and the development of possible solutions.	1.1 In-depth analysis of the nature and complexity of the company's needs. 1.2 Development of appropriate solutions for the needs and the budget allocated. 1.3 Brief evaluation of the effects that may be produced by the planned solutions. 1.4 Pertinence of the information in relation to needs.
2. Recommend a solution.	2.1 Recommendation of the best solution for the company's needs and budget. 2.2 Valid reasons for the recommendation. 2.3 Consideration of company policies in choosing the solution. 2.4 Identification of the proper data migration strategy for the chosen solution. 2.5 Pertinence of consultations with external resource people.
3. Define and propose an installation scenario.	3.1 Correct and complete design of the network architecture. 3.2 Proper choice of protocols, types of links and network operating systems. 3.3 Establishment of the correct sequence of operations. 3.4 Precise estimate of the duration of each operation. 3.5 Accurate evaluation of the necessary material and human resources. 3.6 Precise estimate of the installation costs. 3.7 Clear and precise presentation of the scenario.

CODE : 0185	
Elements of the Competency	**Performance Criteria**
4. Document the installation process.	4.1 Clear, precise and complete documentation of the pertinent information. 4.2 Quality writing. 4.3 Proper updating of the network diagram.

CODE : 0186	
OBJECTIVE	STANDARD
Statement of the Competency Install a computer network.	**Achievement Context** • Based on an installation scenario. • Based on the hardware and software to be installed and the appropriate tools. • Based on company standards. • In conjunction with external resource people. • Using pertinent technical reference documents.
Elements of the Competency	**Performance Criteria**
1. Analyze the installation scenario.	1.1 Accurate, detailed analysis of the scenario. 1.2 Pertinence of collecting complementary data. 1.3 Pertinence of the changes to the scenario.
2. Identify the human resource, hardware and software needs and ensure the availability of these resources.	2.1 Identification of the correct number of people and their necessary qualifications. 2.2 Proper specification of the features of the necessary hardware and software elements. 2.3 Appropriate verification of the availability of resources. 2.4 Use of appropriate information research methods and tools.
3. Create a prototype.	3.1 Creation of a prototype for the planned installation. 3.2 Appropriate prototype testing. 3.3 Correction of the prototype's deficiencies as revealed in the tests.
4. Install cables.	4.1 Correct preparation of a wiring diagram. 4.2 Careful installation of wires according to standards. 4.3 Appropriate installation of connectors. 4.4 Appropriate verification of the installation and connections.
5. Install hardware and software.	5.1 Installation of the components according to a pre-determined sequence. 5.2 Correct installation of each component. 5.3 Respect for deadlines.
6. Verify the effectiveness of the installation.	6.1 Use of appropriate verification tools. 6.2 Careful verification of the effectiveness of each component in the ensemble. 6.3 Appropriate resolution of encountered problems.

CODE : 0186	
Elements of the Competency	**Performance Criteria**
7. Log the installation.	7.1 Proper, precise and complete logging of information. 7.2 Precise updating of the inventory.

CODE : 0187	
OBJECTIVE	STANDARD
Statement of the Competency Manage a computer network.	**Achievement Context** • Based on requests concerning various tasks representative of the workplace. • Using a workstation and appropriate software. • Based on a diagram of the network architecture. • Based on company standards. • In conjunction with internal and external resource people. • Using technical and other pertinent reference documents. • Based on the company's record of problems and solutions. • Using necessary materials.
Elements of the Competency	**Performance Criteria**
1. Examine the company's computing environment.	1.1 Examination of the particular features of the network architecture. 1.2 Examination of the different servers and their respective roles. 1.3 Proper identification of how the clients will use the network.
2. Organize short- and long-term work.	2.1 Complete listing of the operations to be performed according to the requests received. 2.2 Proper prioritization of requests. 2.3 Realistic estimate of the time to be allotted to each operation. 2.4 Consideration of past problems and their solutions. 2.5 Establishment of a short- and long-term working schedule. 2.6 Rapid and proper adaptation of the work schedule in response to unforeseen situations. 2.7 Demonstration of good organizational skills.

CODE : 0187	
Elements of the Competency	**Performance Criteria**
3. Carry out the work.	3.1 Proper co-ordination of tasks. 3.2 Effective management of unforeseen situations. 3.3 Demonstration of independence, availability, resourcefulness and self-control. 3.4 Demonstration of a sense of responsibility. 3.5 Actions favouring harmonious interpersonal relationships. 3.6 Efficient performance of work. 3.7 Appropriate adaptation of their approach to different people and situations.
4. Follow-up the work.	4.1 Proper application of an effective work follow-up method. 4.2 Regular verification to ensure that clients are satisfied with the service. 4.3 Regular logging of data on each operation performed.
5. Evaluate their effectiveness on the job.	5.1 Pertinence of the tools and evaluation methods used. 5.2 Proper identification of their strengths and weaknesses. 5.3 Appropriate measures taken to improve the quality of their work.

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 programme 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.

Outcome Objectives

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 humankind 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 humankind, 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.

Outcome Objectives

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.

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.

    1) 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.
    2) 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 :

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

- sur le plan des habiletés, qu'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;

- sur le plan des attitudes, qu'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, as part of the core curriculum, is aimed at promoting the development of the whole person and at 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 the literature and methodically apply them to physical activities apt to lead them to adopt behaviours characteristic of a healthy lifestyle.

2) Physical Education enables students to improve their proficiency 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 for a given physical activity (i.e., their skills and attitudes).

3) Physical Education contributes to making students responsible for assuming responsibility for their 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 factors which promote health.

4) Physical Education makes students aware of the importance of sharing the knowledge 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 behaviours.

Outcome Objectives

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 one's fitness.
  - Ways to assess their abilities and needs with respect to activities which can enhance their health.
  - The rules, techniques and conditions involved in different types of physical activity.
  - A method for setting goals.
  - The factors which facilitate making physical activity part of one's lifestyle.

- their ability 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, their attitudes and their progress with respect to different forms of physical activity.
  - Maintain or increase their physical activity level and fitness level on their own.
  - Manage a personal physical activity program and assume responsibility in the organization of physical activities.

- their capacity to (i.e., their attitudes):
  - Recognize the importance of taking charge of their health.
  - Be aware of the need to evaluate and respect their abilities and how the activity is to be carried out, before initiating the activity.
  - Foster self-confidence, self-control, respect for others and cooperation, through the 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 good 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 promotion. This enables them to make an appropriate and justified choice of physical activities.

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

The third set is aimed at bringing students to integrate physical activity into their lifestyle, more particularly through more effective management of factors which facilitate such an integration. During contact-hours with the teacher, students apply the knowledge they have acquired in the first two sets. 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 personal work enable students to complete their personal program.

Éducation

Québec

17-0154-01A