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*Vocational Education Program*

5771

# Electronic Audio/Video Equipment Repair

Training Sector

9

Electrotechnology

Québec 

*Vocational Education Program*

5771

# Electronic Audio/Video Equipment Repair

Training Sector

9

Electrotechnology

Formation professionnelle et technique  
et formation continue

Direction générale des programmes  
et du développement

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# **ELECTROTECHNOLOGY**

## **ELECTRONIC AUDIO/VIDEO EQUIPMENT REPAIR**

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### **PROGRAM OF STUDY 5771**

The electronic audio/video equipment repair program leads to the Diploma of Vocational Studies (DVS) and prepares the student to practise the trade of **electronic equipment technician**.

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**Direction générale des programmes  
et du développement**

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## INTRODUCTION

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The *Electronic Audio/Video Equipment Repair* program is based on the orientations for secondary school vocational education that calls for the participation of experts from the workplace and the field of education.

The program of study is developed in terms of competencies, expressed as objectives. These objectives are divided into modules, which are organized into teaching blocks. Various factors were kept in mind in developing the program : training needs, the job situation, purposes, goals, strategies and means used to attain objectives.

The program of study lists the competencies that are the minimum requirements for a Diploma of Vocational Studies (DVS) for students in both the youth and adult sectors. It also provides the basis for organizing courses, planning teaching strategies, and designing instructional and evaluation materials.

The *Electronic Audio/Video Equipment Repair* program leads to a Diploma of Vocational Studies. For admission, students must meet the following conditions :

- For students having a secondary school diploma or recognized equivalent, no additional conditions are required.

OR

- For students of at least 16 years of age on September 30th of the school year in which they begin their program, there is an additional condition for admittance : students must have earned 4th year secondary school credits in the language of instruction, second language, and mathematics or their equivalents.

OR

- Students of at least 18 years of age must have passed the general development test, the SPR 3, 4, 5 and 6 tests in English, language of instruction and course 4068-1 in mathematics or their equivalents.

OR

- Students with 3rd year secondary school credits in the language of instruction, second language and mathematics in ministry-established programs must take, along with the vocational training, general education components in order to obtain the credits missing among the following : 4th year secondary school language of instruction, second language and mathematics in ministry-established programs.

The duration of the program is 1800 hours, which includes 720 hours spent on the specific competencies required to practise the trade and 1080 hours on general competencies. The program of study is divided into 24 modules, which vary in length from 15 to 120 hours (multiples of 15). The time allocated to the program is to be used not only for teaching but also for evaluation and remedial work.

This document contains two parts. Part I is of general interest and provides an overview of the training in six chapters. Chapter 1 presents a synoptic table of basic information. Chapter 2 defines the program training goals; Chapter 3 deals with the expected competencies to be developed and Chapter 4, general objectives. Chapter 5 details the operational objectives. Finally, Chapter 6 addresses harmonization. Part II is designed primarily for those directly involved in implementing the program. It contains a description of the operational objectives of each module.

## **GLOSSARY**

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### **Program Training Goals**

Statements that describe the educational aims of a program. These goals are the general goals of vocational education adapted to a specific trade or occupation.

### **Competency**

A set of socio-affective behaviours, cognitive skills or psycho-sensori-motor skills that enable a person to correctly perform a role, function, activity or task.

### **General Objectives**

Instructional objectives that provide an orientation for leading the students to attain one or more related objectives.

### **Operational Objectives**

Statements of the educational aims of a program in practical terms. They serve as the basis for teaching, learning and evaluation.

### **Module of a Program**

A component part of a program of study comprising a first-level operational objective and the related second-level operational objectives.

### **Credit**

A unit used for expressing quantitatively the value of each module in a program of study. One credit corresponds to 15 hours of training. Students must accumulate a set number of credits to graduate from a program.

## Part I

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## 1. SYNOPTIC TABLE

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Number of modules :	24	Program title :	Electronic Audio/Video Equipment Repair
Duration in hours :	1 800	Program code :	5771
Credits :	120	Type of certification :	Diploma of Vocational Studies

CODE	TITLE OF THE MODULE	HOURS	CREDITS*
798051	1 THE TRADE AND THE TRAINING PROCESS	15	1
798066	2 DC CIRCUITS	90	6
798076	3 AC CIRCUITS	90	6
798088	4 SEMICONDUCTOR CIRCUITS	120	8
798094	5 COMPONENT REPLACEMENT	60	4
798105	6 LOGIC CIRCUITS	75	5
798115	7 MICROPROCESSOR CIRCUITS	75	5
798127	8 POWER SUPPLY PROBLEM	105	7
798136	9 AUDIO PROBLEM	90	6
798142	10 MECHANICAL PROBLEM	30	2
798155	11 RADIO WAVE PROCESSING PROBLEM	75	5
798165	12 ANALOG AUDIO EQUIPMENT	75	5
798173	13 NEW TECHNOLOGIES	45	3
798185	14 DIGITAL AUDIO EQUIPMENT	75	5
798198	15 VIDEO PROBLEM	120	8
798207	16 ANALOG TELEVISION RECEIVER	105	7
798217	17 DIGITAL TELEVISION RECEIVER	105	7
798222	18 ADMINISTRATIVE TASKS	30	2
798235	19 DIGITAL AUDIO/VIDEO PLAYER	75	5
798244	20 RECORD AND PLAY PROBLEMS	60	4
798258	21 ANALOG AND DIGITAL AUDIO/VIDEO RECORDERS	120	8
798264	22 HOME THEATRE SYSTEM	60	4
798272	23 CUSTOMER SERVICE	30	2
798285	24 ENTERING THE WORK FORCE	75	5

\* 15 hours = 1 credit.

## **2. PROGRAM TRAINING GOALS**

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The training goals of the *Electronic Audio/Video Equipment Repair* program are based on the general goals of vocational education and take into account the specific nature of the trade. These goals are :

### **To develop effectiveness in the practice of a trade**

- To teach students to perform electronic audio/video equipment repair tasks and activities correctly and at an acceptable level of competence for entry into the job market.
- To prepare students to perform satisfactorily on the job by fostering :
  - intellectual skills and techniques conducive to making wise choices in carrying out tasks;
  - professional ethics and a sense of responsibility;
  - a constant concern for occupational health and safety;
  - good research habits;
  - attention and precision when performing electronic audio/video equipment repair work;
  - neat and orderly work habits.

### **To ensure integration into the job market**

- To familiarize students with the job market in general and with electronic audio/video equipment repair in particular.
- To familiarize students with their rights and responsibilities as workers.
- To help students develop a concern for their customers' rights and expectations.

### **To foster personal development and the acquisition of trade-related knowledge**

- To foster independence, a sense of responsibility and the desire to succeed.
- To help students develop learning skills and acquire good work methods.
- To help students understand the principles underlying the techniques used.

### **To ensure job mobility**

- To help students develop a positive attitude toward technological change and new situations.
- To help students develop the skills required to learn and obtain information.
- To help students prepare for a creative job search.

### 3. COMPETENCIES

---

The competencies to be developed in the *Electronic Audio/Video Equipment Repair* program are shown in the grid of learning focuses on the following page. The grid lists general and specific competencies as well as the major steps in the work process.

General competencies involve activities common to several tasks or situations. They cover, for example, the technological or scientific principles that the students must understand to practise the trade or occupation. Specific competencies focus on tasks and activities that are of direct use in the trade or occupation. The work process includes the most important steps in carrying out the tasks and activities of the trade or occupation.

The grid of learning focuses shows the relationship between the general competencies on the horizontal axis and the specific competencies on the vertical axis. The symbol (+) indicates a correlation between a specific competency and a step in the work process. The symbol (○) indicates a correlation between a general and a specific competency. Shaded symbols indicate that these relationships have been taken into account in the formulation of objectives intended to develop specific competencies related to the trade or occupation.

The logic used in constructing the grid influences the course sequence. Generally speaking, this sequence follows a logical progression in terms of the complexity of the learning involved and the development of the students' autonomy. The vertical axis of the grid shows the competencies directly related to the practice of a specific trade or occupation. These competencies are arranged in a relatively fixed order; therefore, the modules should be taught, insofar as possible, in the order represented on the grid. The modules including the general competencies on the horizontal axis should be taught in relation to those on the vertical axis. This means that some modules are prerequisite to others, while other modules are taught concurrently.



## GRID OF LEARNING FOCUSES

GRID OF LEARNING FOCUSES IN ELECTRONIC AUDIO/VIDEO EQUIPMENT REPAIR			FIRST-LEVEL OPERATIONAL OBJECTIVES DURATION (IN HOURS)		WORK PROCESS (major steps)		GENERAL COMPETENCIES (related to technology, subjects, personal development, etc)														TOTALS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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## 4. GENERAL OBJECTIVES

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The general objectives of the *Electronic Audio/Video Equipment Repair* program are presented below, along with the major statement of each corresponding first-level operational objective.

### **To develop in the students the competencies required to integrate harmoniously into the school and work environments**

- Determine their suitability for the trade and the training process.
- Enter the work force.

### **To develop in the students the competencies required to practise the trade**

- Replace components.
- Perform administrative tasks.
- Gather information on new technologies.
- Provide customer service.

### **To develop in the students the competencies required to verify circuits in electronic audio/video equipment**

- Verify a DC circuit.
- Verify an AC circuit.
- Verify a semiconductor circuit.
- Verify a logic circuit.
- Verify a microprocessor circuit.

### **To develop in the students the competencies required to diagnose problems in electronic audio/video equipment**

- Diagnose a power supply problem.
- Diagnose an audio problem.
- Diagnose a mechanical problem.
- Diagnose a radio wave processing problem.
- Diagnose a video problem.
- Diagnose record and play problems.

### **To develop in the students the competencies required to install and repair electronic audio/video equipment**

- Repair analog audio equipment.
- Repair digital audio equipment.
- Repair an analog television receiver.
- Repair a digital television receiver.
- Repair a digital audio/video player.
- Repair analog and digital audio/video recorders.
- Install a home theatre system.

## 5. OPERATIONAL OBJECTIVES

---

### 5.1 DEFINITION OF OPERATIONAL OBJECTIVES

A first-level objective is defined for each competency to be developed. Competencies are organized into an integrated training program designed to prepare students to practise the trade or occupation. This systematic organization of competencies produces better overall results than training by isolated objectives. More specifically, it insures a smooth progression from one objective to the next, saves teaching time by eliminating needless repetition, and integrates and reinforces learning material.

**First-level operational objectives** are the main, compulsory teaching/learning targets and they are specifically evaluated for certification. There are two kinds of operational objectives : behavioural and situational.

- A **behavioural objective** is a relatively closed objective that describes the actions and results expected of the student by the end of a learning step. Evaluation is based on expected results.
- A **situational objective** is a relatively open-ended objective that outlines the major phases of a learning situation. It allows for output and results to vary from one student to another. Evaluation is based on the student's participation in the activities of the learning context.

**Note:** Programs accompanied by an Analysis and Planning Table (APT) do not have second level operational objectives.

## 5.2 HOW TO READ FIRST-LEVEL OPERATIONAL OBJECTIVES

### 5.2.1 How to read a Behavioural Objective

Behavioural objectives consist of six components. The first three provide an overview of the objective :

- The **expected behaviour** states a competency in terms of the general behaviour that the students are expected to have acquired by the end of the module.
- The **conditions for performance evaluation** define what is necessary or permissible to the students during evaluation designed to verify whether or not the students have attained the objective. This means that the conditions for evaluation are the same wherever and whenever the program is taught.
- The **general performance criteria** define the requirements by which to judge whether or not the results obtained are generally satisfactory.

The last three components ensure that the objective is understood clearly and unequivocally :

- The **specifications of the expected behaviour** describe the essential elements of the competency in terms of specific behaviours.
- The **specific performance criteria** define the requirements for each of the specifications of behaviour. They ensure a more enlightened decision on the attainment of the objective.
- The **field of application** defines the limits of the objective, where necessary. It indicates cases where the objective applies to more than one task, trade or field.

## 5.2.2 How to Read a Situational Objective

Situational objectives consist of six components :

- The **expected outcome** states a competency as an aim to be pursued throughout the course.
- The **specifications** outline the essential aspects of the competency and ensure a better understanding of the expected outcome.
- The **learning context** provides an outline of the learning situation designed to help students develop the required competencies. It is normally divided into three phases of learning :
  - information
  - performance, practice or involvement
  - synthesis, integration and self-evaluation
- The **instructional guidelines** provide suggested ways and means of teaching the course to ensure that learning takes place and that the same conditions apply wherever and whenever the course is taught. These guidelines may include general principles or specific procedures.
- The **participation criteria** describe the requirements students must fulfil, which are usually related to each phase of the learning context. They focus on how students take part in the activities rather than on the results obtained. Participation criteria are normally provided for each phase of the learning context.
- **The field of application** defines the limits of the objective, where necessary. It indicates cases where the objective applies to more than one task, trade or field.

## 6. HARMONIZATION

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The ministry harmonizes vocational and technical programs to establish similarities and continuity between secondary- and college-level programs. Harmonization also establishes correlations between programs within the same educational level.

Regardless of whether harmonization is inter- or intra-level or in the same or different fields of study, its goal is to identify the competencies acquired in order to facilitate the training process.

Harmonization is considered throughout the program planning and revision process. Regardless of the method used, it is always based on correlations between the competencies of the various programs.

The *Electronic Audio/Video Equipment Repair* program of study harmonizes with programs leading to a Diploma of Vocational Studies (DVS) in :

- office equipment;
- telecommunications equipment;
- electricity;
- security systems;
- automated systems electromechanics;
- electric household appliances.

The program also harmonizes with programs leading to a Diploma of College Studies (DCS) in *Electronics : Audiovisual Equipment*.

The results of this harmonization will be presented in a document entitled *Harmonisation des programmes d'études du secteur de formation électrotechnique*.<sup>1</sup>

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<sup>1</sup> Once it is ready, this document will be translated by the Direction de la production en langue anglaise.

## Part II

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## MODULE 1 : THE TRADE AND THE TRAINING PROCESS

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Code : 798051

Duration : 15 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### SITUATIONAL OBJECTIVE

##### EXPECTED OUTCOME

By participating in the required activities of the learning context according to the indicated criteria, the students will be able to  
**determine their suitability for the trade and the training process.**

##### SPECIFICATIONS

At the end of this module, the students will :

- Be familiar with the nature of the trade.
- Understand the training program.
- Confirm their career choice.

##### LEARNING CONTEXT

##### PHASE 1 : Information on the Trade

- Learning about electronic audio/video equipment repair work.
- Learning about the nature and requirements of the job (i.e. tasks, working conditions, etc.).
- Presenting information collected during a group meeting and discussing personal impressions of the trade.

##### PHASE 2 : Information on the Program and Participation in the Training Process

- Discussing the skills, aptitudes and knowledge needed to practise the trade.
- Becoming familiar with the training program.
- Discussing how the training program prepares them to find employment in electronic audio/video equipment repair.
- Giving their first impressions of the trade and the training process.

## **SITUATIONAL OBJECTIVE (cont.)**

### **PHASE 3 : Evaluation and Confirmation of Career Choice**

- Writing a report in which they :
  - describe their preferences, aptitudes and interests with respect to electronic audio/video equipment repair;
  - assess their career choice by comparing the different facets and demands of the trade with their own aptitudes and interests.

### **INSTRUCTIONAL GUIDELINES**

The teacher should :

- Create an environment conducive to personal growth and professional development.
- Encourage students to engage in discussions and express their opinions.
- Involve students in learning activities.
- Provide students with the means to acquire a clear, objective understanding of the trade.
- Provide students with the means to honestly and objectively assess their career choice.
- Organize field trips to establishments associated with electronic audio/video equipment repair.
- Make suitable reference material available to the students (e.g. information on the trade, training programs, handbooks, etc.).
- Arrange for students to meet with trade specialists.

### **PARTICIPATION CRITERIA**

- PHASE 1 :**
- Collect information on most of the topics to be covered.
  - Express their views on the trade at a group meeting, interrelating the information they have collected.

- PHASE 2 :**
- Give their opinion on some requirements of practising the trade.
  - Examine the reference material provided.
  - Listen carefully to explanations.
  - Express their views on the training program at a group meeting.
  - Express their reactions clearly.

- PHASE 3 :**
- Write a report that :
    - sums up their preferences, interests, aptitudes and personal qualities;
    - explains clearly how they arrived at their career choice;
    - explains why they chose to continue or abandon the training program.

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## MODULE 2 : DC CIRCUITS

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Code : 798066

Duration : 90 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **verify a DC circuit** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- Using :
  - a mixed circuit composed only of resistors;
  - a circuit diagram.
- Using measuring instruments.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Adherence to the verification process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Interpret a circuit diagram.

B. Calculate values at different points in the circuit.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper interpretation of the terminology.
- Proper interpretation of the schematic diagram :
  - proper recognition of symbols;
  - proper identification of conventions;
  - identification of specified values.
- Proper identification of components to be verified.
- Application of laws.
- Appropriate use of mathematical formulas.
- Precise calculations.

## BEHAVIOURAL OBJECTIVE (cont.)

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

C. Take measurements at different points in the circuit.

D. Interpret results.

### SPECIFIC PERFORMANCE CRITERIA

- Proper choice of measuring instruments.
- Proper use of measuring instruments.
- Proper connections at measurement points.
- Precision measurement of voltage, current and resistance.

- Proper interpretation of calculations.
- Proper interpretation of measurements.
- Determination of causes of inconsistencies.
- Proper evaluation of circuit operation.

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## MODULE 3 : AC CIRCUITS

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Code : 798076

Duration : 90 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **verify an AC circuit** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - a circuit composed of resistors, inductors and capacitors;
  - a circuit diagram.
- Using measuring instruments.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Adherence to the verification process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Interpret a circuit diagram.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper interpretation of the terminology.
- Proper interpretation of the schematic diagram :
  - proper recognition of symbols;
  - proper identification of conventions;
  - identification of specified values.
- Proper identification of components to be verified.

BEHAVIOURAL OBJECTIVE (cont.)	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Calculate values at different points in the circuit.	<ul style="list-style-type: none"> <li>— Application of laws.</li> <li>— Proper consideration for the characteristics of two out-of-phase sine waves.</li> <li>— Appropriate use of mathematical formulas.</li> <li>— Precise calculations.</li> </ul>
C. Take measurements at different points in the circuit.	<ul style="list-style-type: none"> <li>— Proper choice of measuring instruments.</li> <li>— Proper use of measuring instruments.</li> <li>— Proper connections at measurement points.</li> <li>— Correct measurements.</li> </ul>
D. Interpret results.	<ul style="list-style-type: none"> <li>— Proper interpretation of calculations.</li> <li>— Proper interpretation of measurements.</li> <li>— Determination of causes of inconsistencies.</li> <li>— Proper evaluation of circuit operation.</li> </ul>

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## MODULE 4 : SEMICONDUCTOR CIRCUITS

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Code : 798088

Duration : 120 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **verify a semiconductor circuit** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - a semiconductor circuit;
  - a circuit diagram.
- Using :
  - measuring instruments;
  - a service manual;
  - an audio wave generator.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Adherence to the verification process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Interpret a semiconductor circuit diagram.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper interpretation of the schematic diagram :
  - proper recognition of symbols;
  - proper identification of conventions.
- Accurate distinction of the semiconductor circuit elements, i.e. diodes, transistors, thyristors, integrated circuit elements, etc.
- Appropriate use of a service manual.



BEHAVIOURAL OBJECTIVE (cont.)	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Take measurements.	<ul style="list-style-type: none"> <li>— Proper choice of measuring instruments.</li> <li>— Proper use of measuring instruments.</li> <li>— Proper connections at measurement points.</li> <li>— Exact measurements.</li> </ul>
C. Interpret results.	<ul style="list-style-type: none"> <li>— Proper interpretation of measurements.</li> <li>— Proper consideration of characteristics provided in a service manual.</li> <li>— Appropriate interpretation of differences in substitution characteristics.</li> <li>— Proper evaluation of circuit operation.</li> </ul>

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## MODULE 5 : COMPONENT REPLACEMENT

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Code : 798094

Duration : 60 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **replace components** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - a circuit board on which the component must be replaced;
  - a circuit board with surface-mounted components;
  - a soldering and unsoldering station.
- Using :
  - tools;
  - replacement components;
  - chemicals;
  - soldering materials;
  - a service manual.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Appropriate use of tools.
- Precise and methodical work.
- Clean work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Prepare the equipment.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper connection of station elements.
- Careful verification of accessories.
- Correct installation of soldering iron tips.
- Appropriate tinning of the soldering irons.

BEHAVIOURAL OBJECTIVE (cont.)	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Remove a component.	<ul style="list-style-type: none"> <li>— Proper choice of tools.</li> <li>— Appropriate use of equipment.</li> <li>— Proper choice of soldering iron.</li> <li>— Proper choice of soldering iron tip.</li> <li>— Proper adjustment of the station for the iron tip used.</li> <li>— Proper adjustment of iron temperature.</li> <li>— Careful use of tools.</li> </ul>
C. Clean the location.	<ul style="list-style-type: none"> <li>— Proper choice of cleaning products.</li> <li>— Safe use of cleaning products.</li> <li>— Complete cleaning of location.</li> </ul>
D. Attach a new component.	<ul style="list-style-type: none"> <li>— Proper choice of tools.</li> <li>— Proper component attachment.</li> <li>— Proper choice of iron tip.</li> <li>— Proper adjustment of iron temperature.</li> <li>— Proper choice of the solder to use.</li> <li>— Proper use of rosin.</li> <li>— Careful inspection of attachment quality.</li> <li>— Solidity of the attachment.</li> <li>— Careful cleaning of the attachment.</li> </ul>
E. Maintain the equipment.	<ul style="list-style-type: none"> <li>— Proper maintenance of tips used.</li> <li>— Complete and careful cleaning of soldering irons.</li> <li>— Proper storage of soldering irons and tips.</li> </ul>
F. Clean up the work area.	<ul style="list-style-type: none"> <li>— Careful cleaning of tools.</li> <li>— Proper tool storage.</li> <li>— Safe storage of cleaning products.</li> </ul>

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## MODULE 6 : LOGIC CIRCUITS

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Code : 798105

Duration : 75 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **verify a logic circuit** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - a combinational logic circuit;
  - a sequential logic circuit.
- Using :
  - a service manual;
  - data sheets;
  - schematic diagrams;
  - measuring instruments, including a logic probe.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information.
- Adherence to the verification process.
- Precise and methodical work.

BEHAVIOURAL OBJECTIVE (cont.)	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Interpret a combinational logic circuit diagram.	<ul style="list-style-type: none"> <li>— Proper interpretation of the schematic diagram : <ul style="list-style-type: none"> <li>■ proper recognition of symbols;</li> <li>■ proper identification of conventions;</li> <li>■ identification of specified values.</li> </ul> </li> <li>— Proper interpretation of truth tables.</li> <li>— Proper interpretation of logic gate operation.</li> <li>— Proper identification of components to be verified.</li> </ul>
B. Interpret a sequential logic circuit diagram.	<ul style="list-style-type: none"> <li>— Proper interpretation of symbols and conventions.</li> <li>— Proper interpretation of truth tables.</li> <li>— Proper understanding of RS, D and JK flip-flop operation.</li> </ul>
C. Take measurements.	<ul style="list-style-type: none"> <li>— Proper choice of measuring instruments.</li> <li>— Proper use of measuring instruments.</li> <li>— Proper choice of measurement points.</li> </ul>
D. Interpret results.	<ul style="list-style-type: none"> <li>— Proper identification of logic levels.</li> <li>— Proper interpretation of measurements.</li> <li>— Proper evaluation of circuit operation.</li> </ul>

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## MODULE 7 : MICROPROCESSOR CIRCUITS

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Code : 798115

Duration : 75 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **verify a microprocessor circuit** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- Using a circuit with a dedicated microprocessor.
- Using :
  - a circuit diagram;
  - a service manual;
  - measuring instruments.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information.
- Adherence to the verification process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Interpret a microprocessor circuit diagram.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper interpretation of the terminology.
- Proper interpretation of the schematic diagram :
  - proper recognition of symbols;
  - proper identification of conventions;
  - identification of specified values.
- Proper determination of the type of microprocessor used.
- Proper identification of components to be verified.

BEHAVIOURAL OBJECTIVE (cont.)	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Consult information on the dedicated microprocessor.	— Efficient consultation of information on the microprocessor's pins.
C. Take measurements.	<ul style="list-style-type: none"> <li>— Proper identification of pins.</li> <li>— Proper choice of measuring instruments.</li> <li>— Proper use of measuring instruments.</li> <li>— Proper choice of measurement points.</li> <li>— Correct reading of measurements.</li> </ul>
D. Interpret results.	<ul style="list-style-type: none"> <li>— Proper identification of logic levels.</li> <li>— Proper interpretation of measurements.</li> <li>— Proper evaluation of circuit operation.</li> </ul>



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## MODULE 8 : POWER SUPPLY PROBLEM

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Code : 798127

Duration : 105 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **diagnose a power supply problem** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- Using equipment demonstrating defects related to :
  - an AC/DC power supply circuit;
  - a switching power supply circuit.
- Using :
  - a service manual;
  - block and schematic diagrams;
  - measuring instruments;
  - variable power sources.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information.
- Adherence to the diagnostic process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Determine the problem.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper choice of power source.
- Safe connection of the equipment to the power source.
- Proper physical inspection of :
  - an AC/DC power supply circuit;
  - a switching power supply circuit.
- Precise description of the problem.

BEHAVIOURAL OBJECTIVE (cont.)	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Interpret diagrams.	<ul style="list-style-type: none"> <li>— Proper interpretation of the block diagram : <ul style="list-style-type: none"> <li>■ proper identification of the type of power supply circuit;</li> <li>■ proper identification of regulating elements.</li> </ul> </li> <li>— Proper interpretation of the schematic diagram.</li> </ul>
C. Make hypotheses.	<ul style="list-style-type: none"> <li>— Complete hypotheses.</li> <li>— Relevant hypotheses.</li> </ul>
D. Measure values and waveforms.	<ul style="list-style-type: none"> <li>— Proper choice of measuring instruments.</li> <li>— Proper use of measuring instruments.</li> <li>— Proper choice of circuit operating conditions : voltage source, loads, ambient temperature, etc.</li> <li>— Proper choice of measurement points.</li> </ul>
E. Interpret measurements and waveforms.	<ul style="list-style-type: none"> <li>— Proper interpretation of measurements and waveforms.</li> </ul>
F. Determine the cause(s) of the power supply problem.	<ul style="list-style-type: none"> <li>— Proper diagnosis.</li> </ul>

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## MODULE 9 : AUDIO PROBLEM

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Code : 798136

Duration : 90 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **diagnose an audio problem** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- Using equipment with a defective audio circuit.
- Using :
  - a service manual;
  - block and schematic diagrams;
  - measuring instruments;
  - an audio signal generator.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information.
- Adherence to the diagnostic process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Determine the problem.

B. Interpret diagrams.

##### SPECIFIC PERFORMANCE CRITERIA

- Safe connection of the equipment to the power source.
- Appropriate physical inspection of the circuit.
- Precise description of the problem.
- Exact identification of analog and digital audio circuit characteristics.
- Proper interpretation of the block diagram.
- Proper interpretation of the schematic diagram.

**BEHAVIOURAL OBJECTIVE (cont.)**

**SPECIFICATIONS OF THE  
EXPECTED BEHAVIOUR**

**SPECIFIC PERFORMANCE CRITERIA**

- |                                                 |                                                                                                                                                                                                                                         |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C. Make hypotheses.                             | <ul style="list-style-type: none"><li>— Complete hypotheses.</li><li>— Relevant hypotheses.</li></ul>                                                                                                                                   |
| D. Measure values and waveforms.                | <ul style="list-style-type: none"><li>— Proper choice of measuring instruments.</li><li>— Proper use of measuring instruments.</li><li>— Proper choice of audio input signals.</li><li>— Proper choice of measurement points.</li></ul> |
| E. Interpret measurements and waveforms.        | <ul style="list-style-type: none"><li>— Proper interpretation of measurements and waveforms.</li></ul>                                                                                                                                  |
| F. Determine the cause(s) of the audio problem. | <ul style="list-style-type: none"><li>— Proper diagnosis.</li></ul>                                                                                                                                                                     |

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## MODULE 10 : MECHANICAL PROBLEM

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Code : 798142

Duration : 30 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **diagnose a mechanical problem** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- Using an audio/video recorder with a mechanical problem.
- Using :
  - a service manual;
  - tools and measuring instruments;
  - specialized equipment.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information.
- Appropriate use of tools and measuring instruments.
- Adherence to the diagnostic process.
- Precise and methodical work.
- Clean work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Determine the problem.

B. Take necessary measurements.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper physical inspection of mechanisms.
- Appropriate use of a dummy cassette, if necessary.
- Relevance of the decision whether or not to use a test cassette or CD.
- Precise description of the problem.
- Proper use of measuring instruments.

BEHAVIOURAL OBJECTIVE (cont.)	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
C. Understand a service manual.	<ul style="list-style-type: none"> <li>— Proper identification of symbols and conventions.</li> <li>— Proper interpretation of exploded views.</li> <li>— Proper understanding of technical indications.</li> </ul>
D. Disassemble mechanical parts.	<ul style="list-style-type: none"> <li>— Proper choice of tools.</li> <li>— Adherence to disassembly instructions.</li> <li>— Careful handling of parts.</li> <li>— Careful storage of the parts.</li> </ul>
E. Identify the source of the mechanical problem.	<ul style="list-style-type: none"> <li>— Careful verification of the parts.</li> <li>— Proper identification of the defective part or improper adjustment.</li> </ul>

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## MODULE 11 : RADIO WAVE PROCESSING PROBLEM

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Code : 798155

Duration : 75 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **diagnose a radio wave processing problem** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- Using equipment demonstrating a defective radio wave processing circuit.
- Using :
  - a service manual;
  - block and schematic diagrams;
  - measuring instruments;
  - a radio signal generator.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information.
- Adherence to the diagnostic process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Determine the problem.

##### SPECIFIC PERFORMANCE CRITERIA

- Safe connection of the equipment to the power source.
- Proper choice of radio signal source.
- Appropriate physical inspection of the circuit
- Precise description of the problem.

## BEHAVIOURAL OBJECTIVE (cont.)

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

- |                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B. Interpret diagrams.                                          | <ul style="list-style-type: none"> <li>— Proper interpretation of the block diagram :               <ul style="list-style-type: none"> <li>■ identification of the type of transmission used;</li> <li>■ exact identification of the type of radio wave processing circuit;</li> <li>■ proper identification of the tuning elements using a phase locked loop (PLL) synthesizer.</li> </ul> </li> <li>— Proper interpretation of the schematic diagram.</li> </ul> |
| C. Make hypotheses.                                             | <ul style="list-style-type: none"> <li>— Complete hypotheses.</li> <li>— Relevant hypotheses.</li> </ul>                                                                                                                                                                                                                                                                                                                                                           |
| D. Measure values and waveforms                                 | <ul style="list-style-type: none"> <li>— Proper choice of measuring instruments.</li> <li>— Proper use of measuring instruments.</li> <li>— Proper choice of analog or digital radio wave input signals.</li> <li>— Appropriate use of the radio signal generator.</li> <li>— Proper choice of measurement points.</li> </ul>                                                                                                                                      |
| E. Interpret measurements and waveforms.                        | <ul style="list-style-type: none"> <li>— Proper interpretation of measurements and waveforms.</li> </ul>                                                                                                                                                                                                                                                                                                                                                           |
| F. Determine the cause(s) of the radio wave processing problem. | <ul style="list-style-type: none"> <li>— Proper diagnosis.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |



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## MODULE 12 : ANALOG AUDIO EQUIPMENT

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Code : 798165

Duration : 75 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **repair analog audio equipment** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - analog audio equipment with an operational problem;
  - replacement components.
- Using :
  - a work order;
  - a service manual;
  - tools and measuring instruments;
  - cleaning products and lubricants.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper interpretation of a service manual and schematic diagrams.
- Proper use of tools and measuring instruments.
- Adherence to working procedures.
- Properly functioning equipment.
- Cleanliness of the equipment and work area.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Inspect the equipment.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper understanding of the work order.
- Proper physical inspection of the equipment.
- Recognition of signs of malfunction.

BEHAVIOURAL OBJECTIVE (cont.)	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
B. Plan the work.	<ul style="list-style-type: none"> <li>— Plausible hypotheses concerning possible sources of the operational problem : power supply, tuning, detection, amplification, record, play, mechanisms, etc.</li> <li>— Correct determination of verifications to be made.</li> <li>— Proper choice of tools and instruments.</li> <li>— Proper evaluation of the time and cost of the repair work.</li> </ul>
C. Diagnose the problem.	<ul style="list-style-type: none"> <li>— Systematic testing of hypotheses.</li> <li>— Precise identification of test points.</li> <li>— Appropriate measurements.</li> <li>— Proper interpretation of measurements.</li> <li>— Proper diagnosis.</li> </ul>
D. Make repairs.	<ul style="list-style-type: none"> <li>— Precision work.</li> <li>— Proper choice of replacement parts : original parts or substitution parts.</li> <li>— Correct component replacement.</li> <li>— Respect for specifications.</li> <li>— Absence of previously observed signs of malfunction.</li> <li>— Precise adjustments.</li> </ul>
E. Perform required maintenance.	<ul style="list-style-type: none"> <li>— Appropriate cleaning of mechanisms.</li> <li>— Lubrication according to manufacturer's specifications.</li> </ul>
F. Verify equipment operation.	<ul style="list-style-type: none"> <li>— Careful verification of main functions of the equipment : choice of station, volume, frequency balance, surround-sound, cassette playing and recording, etc.</li> </ul>

BEHAVIOURAL OBJECTIVE <i>(cont.)</i>	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
G. Prepare an invoice.	<ul style="list-style-type: none"><li>— Exact identification of the equipment and its owner.</li><li>— Exact identification of replaced parts.</li><li>— Precise description of the work performed.</li><li>— Exact calculation of the cost of repairs.</li></ul>

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## MODULE 13 : NEW TECHNOLOGIES

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Code : 798173

Duration : 45 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **gather information on new technologies** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - a computer;
  - Internet access;
  - a prototype or new equipment.
- Using :
  - specialized journals;
  - a service manual.

##### GENERAL PERFORMANCE CRITERIA

- Effectiveness of research.
- Demonstration of independence and a capacity to learn.
- Demonstration of interest in the new technologies.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Identify information sources.

##### SPECIFIC PERFORMANCE CRITERIA

- Recent and relevant information sources.
- Exact identification of sources of verbal and written information as well as sources from new information and communication technologies.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

B. Gather information.

- Identification of essential information in a service manual, specialized journals and reference materials.
- Correct use of a computer :
  - operating system;
  - software used.
- Efficient Internet navigation :
  - appropriate use of a browser;
  - proper choice of search tools.
- Attention to counsel and opinions provided by resource personnel.
- Careful inspection of new equipment.

C. Process the gathered information.

- Proper understanding of the information.
- Proper comparison of the similarities and differences between the new and old technologies.
- Summary of information.

D. Record the information.

- Proper storage of information.

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## MODULE 14 : DIGITAL AUDIO EQUIPMENT

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Code : 798185

Duration : 75 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **repair digital audio equipment** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - digital audio equipment with an operational problem;
  - replacement components.
- Using :
  - a work order;
  - a service manual;
  - tools and measuring instruments;
  - test CDs;
  - lubricants and cleaning products.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper interpretation of a service manual and schematic diagrams.
- Proper use of tools and measuring instruments.
- Adherence to work procedures.
- Properly functioning equipment.
- Cleanliness of the equipment and work area.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Inspect the equipment.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper understanding of the work order.
- Proper physical inspection of the equipment.
- Proper identification of signs of malfunction.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

B. Plan the work.

- Plausible hypotheses concerning possible sources of the operational problem : power supply, laser pick-up assembly, command, feedback control, tuning, radio frequencies, audio, detection, decoding, encoding, record, play, mechanisms, etc.
- Correct determination of verifications to be made.
- Proper choice of tools and instruments.
- Proper choice of test CD.
- Proper evaluation of the time and cost of the repair work.

C. Diagnose the problem.

- Systematic testing of hypotheses.
- Precise identification of test points.
- Respect for manufacturer's recommendations when the equipment is in test mode.
- Proper interpretation of measurements and waveforms.
- Proper diagnosis.

D. Make repairs.

- Precision work.
- Proper choice of replacement parts : original parts or substitution parts.
- Correct component replacement.
- Respect for specifications.
- Absence of previously observed malfunction.
- Precise adjustments.

E. Perform equipment maintenance.

- Safe cleaning of optical parts.
- Appropriate cleaning of mechanisms.
- Lubrication according to manufacturer's technical specifications.

F. Verify equipment operation.

- Careful verification of the main functions of the equipment : disk insertion and ejection, record, continuous random and programmed play, capacity to cover all sectors, search each disk, etc.

**BEHAVIOURAL OBJECTIVE (cont.)**

**SPECIFICATIONS OF THE  
EXPECTED BEHAVIOUR**

G. Prepare an invoice.

**SPECIFIC PERFORMANCE CRITERIA**

- Proper identification of the equipment and its owner.
- Exact identification of replaced parts.
- Precise description of the work performed.
- Exact calculation of the cost of repairs.



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## MODULE 15 : VIDEO PROBLEM

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Code : 798198

Duration : 120 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **diagnose a video problem** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With equipment having a video signal processing problem.
- Using :
  - a service manual;
  - block and schematic diagrams;
  - measuring instruments.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information.
- Adherence to the diagnostic process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Determine the problem.

##### SPECIFIC PERFORMANCE CRITERIA

- Safe connection of the equipment to the power source.
- Appropriate physical inspection of the circuit.
- Precise description of the problem.
- Proper choice of test cassette.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

B. Interpret diagrams.

- Proper interpretation of the block diagram :
  - exact identification of the video circuit type;
  - correct recognition of analog and digital video processing circuits.
- Proper interpretation of the schematic diagram.

C. Make hypotheses.

- Complete hypotheses.
- Relevant hypotheses.

D. Measure values and waveforms

- Proper choice of measuring instruments.
- Proper use of measuring instruments.
- Proper choice of analog and digital input signals.
- Proper choice of measurement points.

E. Interpret measurements and waveforms.

- Proper interpretation of measurements and waveforms.

F. Determine the cause(s) of the video signal processing problem.

- Proper diagnosis.

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## MODULE 16 : ANALOG TELEVISION RECEIVER

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Code : 798207

Duration : 105 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **repair an analog television receiver** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - an analog television receiver with an operational problem;
  - replacement components.
- Using :
  - a work order;
  - a service manual;
  - tools and measuring instruments;
  - cleaning products.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper interpretation of a service manual and schematic diagrams.
- Proper use of tools and measuring instruments.
- Adherence to work procedures.
- Properly functioning equipment.
- Cleanliness of the equipment and work area.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Inspect the equipment.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper understanding of the work order.
- Proper physical inspection of the equipment.
- Proper identification of signs of malfunction.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

B. Plan the work.

- Plausible hypotheses concerning possible sources of the operational problem : power supply, synchronization, intermediate frequency amplification, demodulators, luminance, chrominance, audio, tuning, deflection, high voltage component, CATHODE RAY TUBE, projectors, etc.
- Correct determination of verifications to be made.
- Proper choice of tools and instruments.
- Proper evaluation of the time and cost of the repair work.

C. Diagnose the problem.

- Systematic testing of hypotheses.
- Precise identification of test points.
- Safe use of a high-voltage probe.
- Proper interpretation of measurements.
- Proper diagnosis.

D. Make repairs.

- Precision work.
- Proper choice of replacement parts.
- Correct component replacement.
- Respect for specifications.
- Absence of previously observed malfunction.
- Precise adjustments.

E. Perform equipment maintenance.

- Appropriate cleaning of projection systems.
- Precise adjustment of the screen according to manufacturer's specifications.

F. Check equipment operation.

- Careful verification of the main functions of the equipment : reception (picture and sound) on all available channels, use in monitor mode, screen display, remote control, etc.

**BEHAVIOURAL OBJECTIVE (cont.)****SPECIFICATIONS OF THE EXPECTED BEHAVIOUR**

G. Prepare an invoice.

**SPECIFIC PERFORMANCE CRITERIA**

- Exact identification of the equipment and its owner.
- Exact identification of replaced parts.
- Precise description of the work performed.
- Exact calculation of the cost of repairs.

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## MODULE 17 : DIGITAL TELEVISION RECEIVER

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Code : 798217

Duration : 105 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **repair a digital television receiver** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - a digital television receiver with an operational problem;
  - replacement components.
- Using :
  - a work order;
  - a service manual;
  - tools and measuring instruments;
  - cleaning products.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper interpretation of a service manual and schematic diagrams.
- Proper use of tools and measuring instruments.
- Adherence to work procedures.
- Properly functioning equipment.
- Cleanliness of the equipment and work area.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Inspect the equipment.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper understanding of the work order.
- Proper physical inspection of the equipment.
- Proper identification of signs of malfunction.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

B. Plan the work.

- Plausible hypotheses concerning possible sources of the operational problem : power supply, tuning, luminance and chrominance signal processing, surround-sound functions, deflection, high voltage component, cathode ray tube, projectors, etc.
- Correct determination of verifications to be made.
- Proper choice of tools and instruments.
- Proper evaluation of the time and cost of the repair work.

C. Diagnose the problem.

- Systematic testing of hypotheses.
- Precise identification of test points.
- Safe use of a high-voltage probe.
- Proper interpretation of measurements.
- Proper diagnosis.

D. Make repairs.

- Precision work.
- Proper choice of replacement parts.
- Correct component replacement.
- Respect for specifications.
- Absence of previously observed malfunction.
- Precise adjustments.

E. Perform equipment maintenance.

- Appropriate cleaning of projection systems.
- Precise adjustment of the screen according to manufacturer's specifications.

F. Check equipment operation.

- Careful verification of the main functions of the equipment : reception (picture and sound) in all available modes, surround-sound functions, access to inputs and outputs, screen display, picture-in-picture, remote control, etc.

**BEHAVIOURAL OBJECTIVE (cont.)**

**SPECIFICATIONS OF THE  
EXPECTED BEHAVIOUR**

G. Prepare an invoice.

**SPECIFIC PERFORMANCE CRITERIA**

- Exact identification of the equipment and its owner.
- Exact identification of replaced parts.
- Precise description of the work performed.
- Exact calculation of the cost of repairs.



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## MODULE 18 : ADMINISTRATIVE TASKS

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Code : 798222

Duration : 30 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **perform administrative tasks** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - a computer;
  - software;
  - Internet access.
- Using :
  - office equipment;
  - catalogues;
  - a service manual.

##### GENERAL PERFORMANCE CRITERIA

- Correct information.
- Adherence to grammar rules.
- Adherence to professional ethics.
- Appropriate use of software.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Write a report.

##### SPECIFIC PERFORMANCE CRITERIA

- Relevance of the information.
- Respect for company requirements.
- Clarity of the report.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

B. Prepare an invoice.

- Exact and precise identification of the equipment.
- Precise identification of the equipment's owner.
- Exact identification of replaced parts.
- Complete information on labour cost.
- Clear indication of taxes.
- Summary description of the work done.
- Exact calculations.

C. Conduct research.

- Precise identification of the desired information.
- Effective communication with resource personnel :
  - proper telephone etiquette;
  - appropriate use of a fax;
  - proper performance of e-mail procedures.
- Proper choice of research technique.
- Judicious use of a service manual.
- Efficient use of Internet sites.
- Effective information search.

D. Order parts.

- Proper choice of supplier.
- Proper use of a service manual and catalogues.
- Exact identification of parts.
- Proper choice of order form.
- Proper choice of order transmission method.

E. Track products.

- Exact and precise inventory of products.
- Exact determination of needs.
- Reasonable anticipation of needs.

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## MODULE 19 : DIGITAL AUDIO/VIDEO PLAYER

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Code : 798235

Duration : 75 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **repair a digital audio/video player** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - a digital audio/video player with an operational problem;
  - replacement components.
- Using :
  - a work order;
  - a service manual;
  - tools and measuring instruments;
  - test disks;
  - lubricants and cleaning products.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper interpretation a service manual and schematic diagrams.
- Proper use of tools and measuring instruments.
- Adherence to work procedures.
- Properly functioning equipment.
- Cleanliness of the equipment and work area.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Inspect the equipment.

##### SPECIFIC PERFORMANCE CRITERIA

- Proper understanding of the work order.
- Proper physical inspection of the equipment.
- Proper identification of signs of malfunction.
- Use of appropriate test CD.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

B. Plan the work.

- Plausible hypotheses concerning possible sources of the operational problem : power supply, mechanisms, laser pick-up assembly, command, feedback control, decoders, display, etc.
- Correct determination of verifications to be made.
- Proper choice of tools and instruments.
- Proper choice of the test CD to use.
- Proper evaluation of the time and cost of the repair work.

C. Diagnose the problem.

- Systematic testing of hypotheses.
- Precise identification of test points.
- Proper interpretation of measurements and waveforms.
- Proper diagnosis.

D. Make repairs.

- Precision work.
- Proper choice of replacement parts.
- Correct component replacement.
- Respect for specifications.
- Absence of previously observed malfunction.
- Precise adjustments.

E. Perform equipment maintenance.

- Safe cleaning of optical parts.
- Appropriate cleaning of mechanisms.
- Lubrication according to the manufacturer's technical specifications.

F. Check equipment operation.

- Careful verification of the main functions of the equipment : disk play, menu access, choice of the various types of audio and video outputs, changing sides, displays, remote control, etc.

**BEHAVIOURAL OBJECTIVE (cont.)**

**SPECIFICATIONS OF THE  
EXPECTED BEHAVIOUR**

G. Prepare an invoice.

**SPECIFIC PERFORMANCE CRITERIA**

- Exact identification of the equipment and its owner.
- Exact identification of replaced parts.
- Precise description of the work performed.
- Exact calculation of the cost of repairs.

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## MODULE 20 : RECORD AND PLAY PROBLEMS

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Code : 798244

Duration : 60 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **diagnose record and play problems** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With an audio/video recorder with a record or play problem.
- Using :
  - a service manual;
  - instruments;
  - test cassettes.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information.
- Adherence to the diagnostic process.
- Precise and methodical work.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Determine the problem.

##### SPECIFIC PERFORMANCE CRITERIA

- Equipment hook-up.
- Appropriate physical inspection of the circuit.
- Proper choice of test cassette.
- Proper choice of the source of signals to be recorded.
- Precise description of the problem.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

B. Interpret diagrams.

- Proper interpretation of the block diagram :
  - exact determination of the type of signal processing circuit;
  - appropriate identification of record and play elements.
- Proper interpretation of the schematic diagram.

C. Make hypotheses.

- Complete hypotheses.
- Relevant hypotheses.

D. Measure values and waveforms.

- Proper choice of signal sources.
- Proper choice of operational mode : record, play, monitor.
- Proper choice of measuring instruments.
- Proper use of measuring instruments.
- Proper choice of measurement points.

E. Interpret measurements and waveforms.

- Proper understanding of measurements and waveforms.

F. Determine the cause(s) of the record and play problems.

- Proper diagnosis.

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## MODULE 21 : ANALOG AND DIGITAL AUDIO/VIDEO RECORDERS

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Code : 798258

Duration : 120 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **repair analog and digital audio/video recorders** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- According to instructions.
- With :
  - an audio/video recorder with an electronic problem;
  - replacement components.
- Using :
  - a work order;
  - a service manual;
  - tools and measuring instruments;
  - test cassettes;
  - lubricants and cleaning products.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Proper understanding of technical information and schematic diagrams.
- Proper use of tools and measuring instruments.
- Adherence to work procedures.
- Properly functioning equipment.
- Cleanliness of the equipment and work area.



## BEHAVIOURAL OBJECTIVE *(cont.)*

### **SPECIFICATIONS OF THE EXPECTED BEHAVIOUR**

A. Inspect the equipment.

B. Plan the work.

C. Diagnose the problem.

D. Make repairs.

### **SPECIFIC PERFORMANCE CRITERIA**

- Proper understanding of the work order.
- Proper physical inspection of the equipment.
- Proper identification of signs of malfunction.
- Plausible hypotheses concerning possible sources of the operational problem : power supply, tuning, detection, record, play, command, feedback control, mechanisms, audio, display, laser pick-up assembly, magnetic heads, etc.
- Correct determination of verifications to be made.
- Proper choice of tools and instruments.
- Proper choice of test cassette or CD.
- Proper evaluation of the time and cost of the repair work.
- Systematic testing of hypotheses.
- Orderly dismantling of mechanisms, if required.
- Precise identification of test points.
- Proper interpretation of measurements.
- Proper diagnosis.
- Careful, precision work.
- Proper choice of replacement parts.
- Correct component replacement.
- Respect for specifications.
- Appropriate reassembly of mechanical parts :
  - adherence to instructions in the maintenance handbook;
  - exact part assembly.
- Absence of previously observed malfunction.
- Precise adjustments.

## BEHAVIOURAL OBJECTIVE *(cont.)*

### **SPECIFICATIONS OF THE EXPECTED BEHAVIOUR**

### **SPECIFIC PERFORMANCE CRITERIA**

E. Perform equipment maintenance.

- Careful verification and cleaning of magnetic heads.
- Appropriate verification and cleaning of optical parts.
- Appropriate cleaning of mechanisms.
- Lubrication according to the manufacturer's technical specifications.

F. Check equipment operation.

- Careful verification of the equipment's main functions at all speeds : record, play, rewind, fast forward, slow and fast play, remote control, signal selection, etc.

G. Prepare an invoice.

- Proper identification of the equipment and its owner.
- Exact identification of replaced parts.
- Precise description of the work performed.
- Exact calculation of the cost of repairs.

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## MODULE 22 : HOME THEATRE SYSTEM

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Code : 798264

Duration : 60 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **install a home theatre system** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- Working individually and as a team.
- According to instructions.
- With :
  - surround-sound audio system;
  - speakers;
  - large screen television;
  - audio/video recorder;
  - digital audio/video player;
  - digital parabolic antenna.
- Using :
  - instruction manuals;
  - tools and instruments;
  - necessary equipment.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to health and safety regulations.
- Appropriate use of tools and instruments.
- Adherence to work techniques.
- Cleanliness of work.
- Respect for laws and regulations.
- Demonstration of courtesy when dealing with customers.

## BEHAVIOURAL OBJECTIVE (cont.)

### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

### SPECIFIC PERFORMANCE CRITERIA

- |                                               |                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Plan the work.                             | <ul style="list-style-type: none"> <li>— Proper interpretation of instruction manuals.</li> <li>— Proper choice of tools and instruments.</li> <li>— Appropriate scheduling of service calls.</li> <li>— Consideration for the customer's availability.</li> </ul>                                                                                                                     |
| B. Perform the work.                          | <ul style="list-style-type: none"> <li>— Respect for installation criteria of the various elements of the system.</li> <li>— Proper choice of cable connection techniques.</li> <li>— Installation according to the customer's wishes.</li> <li>— Proper installation of wires and cables.</li> <li>— Proper connections.</li> <li>— Proper handling of fibre optic cables.</li> </ul> |
| C. Check functioning of equipment.            | <ul style="list-style-type: none"> <li>— All equipment in proper working order.</li> <li>— Careful verification of the main functions of the home theatre system.</li> </ul>                                                                                                                                                                                                           |
| D. Explain how the home theatre system works. | <ul style="list-style-type: none"> <li>— Explanations adapted to the customer's knowledge of the subject.</li> <li>— Clear explanations.</li> <li>— Effective demonstration of the home theatre system.</li> </ul>                                                                                                                                                                     |
| E. Clean up the work area.                    | <ul style="list-style-type: none"> <li>— Appropriate use of cleaning materials.</li> <li>— Careful clean-up of the work area.</li> <li>— Furniture put back in its original place.</li> <li>— Careful handling of furniture.</li> </ul>                                                                                                                                                |
| F. Prepare an invoice.                        | <ul style="list-style-type: none"> <li>— Exact identification of the equipment and its owner.</li> <li>— Precise description of the work performed.</li> <li>— Exact calculation of installation cost.</li> </ul>                                                                                                                                                                      |

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## MODULE 23 : CUSTOMER SERVICE

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Code : 798272

Duration : 30 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### BEHAVIOURAL OBJECTIVE

##### EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **provide customer service** in accordance with the following conditions, criteria and specifications.

##### CONDITIONS FOR PERFORMANCE EVALUATION

- Using a computer.
- Using :
  - equipment;
  - a service manual.

##### GENERAL PERFORMANCE CRITERIA

- Adherence to professional ethics.
- Relevance of the information.
- Effective transmission of information.

##### SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Understand the request.

B. Conduct research.

##### SPECIFIC PERFORMANCE CRITERIA

- Request read or listened to attentively.
- Asking relevant questions to clarify the request.
- Exact identification of the equipment.
- Proper choice of information sources.
- Proper use of search tools.
- Precise location of the desired information.

BEHAVIOURAL OBJECTIVE *(cont.)*

**SPECIFICATIONS OF THE  
EXPECTED BEHAVIOUR**

C. Transmit the information.

- Reasonable response time.
- Explanations given in terms of the customer's knowledge of the subject.
- Clear explanations.
- Proper choice of information transmission method.

D. Prepare an invoice.

- Exact identification of the customer.
- Precise description of the request.
- Complete summary of the information transmitted to the customer.

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## MODULE 24 : ENTERING THE WORK FORCE

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Code : 798285

Duration : 75 hours

### FIRST-LEVEL OPERATIONAL OBJECTIVE

#### SITUATIONAL OBJECTIVE

##### EXPECTED OUTCOME

By participating in the required activities of the learning context according to the indicated criteria, the students will be able to **enter the work force.**

##### SPECIFICATIONS

At the end of this module, the students will :

- Be able to use employment search methods.
- Situate themselves in the work environment.
- Be familiar with the work environment.
- Evaluate the changes in perception after an internship.
- Make preparations to be efficient in the work place.

##### LEARNING CONTEXT

##### PHASE 1 : Searching for an Internship

- Identifying of an internship corresponding to individual professional and personal interests.
- Preparing a résumé and cover letter.
- Taking steps necessary to secure an internship and perform follow-up activities.
- Participating in an interview with an internship supervisor.

##### PHASE 2 : Preparing for the Internship

- Learning about the internship.
- Meeting the internship supervisor to learn about the company's organization.

## **SITUATIONAL OBJECTIVE (cont.)**

### **PHASE 3 : Observing and Participating in Work Activities**

- Observing the work environment.
- Observing various aspects of the trade and participating in professional tasks.
- Verifying the supervisor's satisfaction with student performance.
- Preparing a report on the work environment and main tasks performed in the workplace.

### **PHASE 4 : Comparing Initial Conceptions with the Actual Work Environment**

- Comparing the aspects of the trade with the training received.
- Discussing the attitudes and behaviours required by the work environment.
- Evaluating individual perceptions of various aspects of the trade.

### **INSTRUCTIONAL GUIDELINES**

The teacher should :

- Provide students with access to various information sources on internships.
- Provide students with the means to prepare and transmit résumés and cover letters.
- Organize simulated selection interviews.
- Provide students with the means to choose internships judiciously.
- Ensure that the students understand the objectives and terms of the internship.
- Maintain close cooperation between the school and the company.
- Make possible the observation and performance of professional tasks.
- Provide students with proper supervision.
- Ensure constant supervision of the intern by a company supervisor.
- Intervene effectively and diligently in case of difficulty.
- Encourage the students to exchange opinions and express themselves.

### **PARTICIPATION CRITERIA**

- PHASE 1 :**
- Collection of data on various internships.
  - Prepare a résumé.
  - Highlight individual strong points in a simulated selection interview.

- PHASE 2 :**
- Meet the intern supervisor.
  - Describe the tasks planned for the intern.



### **SITUATIONAL OBJECTIVE** *(cont.)*

- PHASE 3 :**
- Respect the company's policies regarding the intern's activities, work schedule, etc.
  - Production of a report containing information on most of the subjects to observe as well as describing the tasks performed or observed.
- PHASE 4 :**
- Share individual internship reports with the other students.
  - Indicate the internship's influence on the choice of future employment.

