

HOME ELECTRONIC EQUIPMENT REPAIR AND INSTALLATION

**PROGRAM OF STUDY
Ezu-515
5522**

WORKING DOCUMENT

ELECTRO- TECHNOLOGY

HOME ELECTRONIC EQUIPMENT REPAIR AND INSTALLATION

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Ezu-515
5522**

The Home Electronic Equipment Repair and Installation program leads to the Secondary School Vocational Diploma and prepares the student to practise the trade of

REPAIRER

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Legal Deposit: First quarter 1993
Bibliothèque nationale du Québec
ISBN

ACKNOWLEDGMENTS

The ministère de l'Éducation wishes to thank the following people for their invaluable assistance in the development of this program:

Representatives from Business and Industry

Sylvain Rochefort

Brero TV inc., Québec

Jean-Guy Fauchon

Ameublements Tanguay inc., Québec

Jean-Paul Demers

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Gilles Asselin

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Robert Adams

Électronique TV-Vidéo A & R enr., Saint-Tite-des-Caps

Jacques Chalifour

Centre de service Sears, Ville-Vanier

Daniel Desnoyers

Atelier électronique 2000, Québec

Jean Noël

Zenith Radio Canada Itée, Ville de Laval

Gino Vitulli

Sony du Canada, Ville Saint-Laurent

Claude Martin

Corporation des électroniciens du Québec, Saint-Hubert

Benoit Nadeau

Atelier Vidéo Vision, Ville-Vanier

Representatives from Education

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This program of study, *Home Electronic Equipment Repair and Installation*, is issued in accordance with Section 461 of the **Education Act**.

It has been approved by the Confessional committees of the Conseil supérieur de l'éducation in conformity with the provisions of paragraph (a) of Section 23 of **An Act respecting the Conseil supérieur de l'éducation**, as replaced by Section 569 of the **Education Act** (1988, Chapter 84).

This program has been authorized for teaching *Home Electronic Equipment Repair and Installation* in the schools as of

Minister of Education

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INTRODUCTION

The Home Electronic Equipment Repair and Installation program is based on the orientations for secondary school vocational education adopted by the government in 1986. It was designed on the basis of a new framework for developing vocational education programs 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, and strategies and means used to attain objectives.

The program of study lists the competencies that are the minimum requirements for a **secondary school vocational diploma (SSVD)**, 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 duration of the program is 1 800 hours, which includes 1 245 hours spent on the

specific competencies required to practise the trade or occupation and 555 hours on general competencies. The program of study is divided into 36 modules, which vary in length from 15 to 90 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. The modules are organized into 4 blocks of 450 hours each.

This document contains two parts. Part I is of general interest and provides an overview of the training plan. It includes a synoptic table of basic information about the modules, a description of the program training goals, the competencies to be developed and the general objectives, and an explanation of operational objectives. Part II is designed primarily for those directly involved in implementing the program. It contains a description of the operational objectives of each module.

In keeping with this broad approach, three accompanying documents will be provided: a teaching guide, an evaluation guide, and a planning guide.

GLOSSARY

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 the modules 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.

1. SYNOPTIC TABLE

Number of modules: 36

Duration in hours: 1 800

Credits: 120

Home Electronic Equipment Repair and Installation

SIMCA: EZU-515

SESAME: 5522

SIMCA	SESAME	TITLE OF THE MODULE	HOURS	CREDITS*
EDS-281	789-261	1. The Trade and the Training Process	15	1
BDD-282	842-052	2. Occupational Health and Safety	30	2
ECF-281	786-056	3. Analyzing DC Circuits	90	6
ECF-287	786-115	4. Analyzing AC Circuits	75	5
EDS-282	789-273	5. Measuring Instruments	45	3
EDS-283	789-282	6. Plans and Service Manuals	30	2
ECI-284	843-076	7. Solid-State Circuits	90	6
EDQ-281	789-104	8. Power Supply Circuits	60	4
EDS-284	789-301	9. Management and Human Relations	15	1
EDS-285	789-293	10. Replacing Components	45	3
EDS-286	789-313	11. Analyzing Audio Circuits	45	3
EDS-287	789-323	12. Audio Recording and Playback	45	3
EDS-288	789-334	13. Analog Audio Equipment	60	4
BDE-289	842-213	14. Combinational Logic	45	3
BDF-289	842-304	15. Sequential Logic	60	4
EDQ-286	789-156	16. Microprocessors	90	6
EDS-289	789-344	17. Digital Audio Equipment	60	4
EDT-281	789-354	18. Principles of Radio Communications	60	4
EDT-282	789-364	19. Analyzing AM and FM (Multiplex) Radios	60	4
EDT-283	789-374	20. Repairing Radios	60	4
EDT-284	789-382	21. Repairing Telephones	30	2
EDT-285	789-392	22. Repairing Microwave Ovens	30	2
EDT-286	789-405	23. Principles of Monochrome Television	75	5
EDT-287	789-412	24. Tuning Circuits	30	2
EDT-288	789-422	25. Video Circuits	30	2
EDT-289	789-432	26. Deflection, Synchronization and High Voltage	30	2
EEB-281	789-453	27. Repairing Monochrome Monitors	45	3
EEB-282	789-443	28. Repairing Monochrome Television Receivers	45	3
EEB-283	789-464	29. Installing Audio-Visual Equipment	60	4
EEB-284	789-474	30. Principles of Colour Television	60	4
EEB-285	789-483	31. Chrominance and Luminance Circuits	45	3
EEB-286	789-493	32. Digital Video Processing	45	3
EEB-287	789-504	33. Integration into the Workplace	60	4
EEB-288	789-516	34. Repairing Colour Television Receivers	90	6
EEB-289	789-522	35. House Calls	30	2
ECI-289	843-121	36. Job-Search Techniques	15	1

* 15 hours = 1 credit

--- Modules are divided into blocks of 450 hours.

This program leads to an SSVD in Home Electronic Equipment Repair and Installation.

2. PROGRAM TRAINING GOALS

The training goals of the *Home Electronic Equipment Repair and Installation* 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 or an occupation.

- To teach students to perform home electronic equipment repair and installation tasks and activities correctly, at an acceptable level of competence for entry into the job market.
- To prepare students to perform satisfactorily on the job by fostering:
 - the intellectual and technological skills needed to select suitable work methods and products
 - a concern for ethical behaviour and a sense of responsibility
 - a constant concern for occupational health and safety

To ensure integration into the working world.

- To familiarize students with the job market in general and the trade of home electronic equipment repair and installation in particular.
- To familiarize students with the rights and responsibilities of workers.
- To encourage students to respect the customers' rights and meet their expectations.

To foster the development of occupational knowledge.

- To foster independence and instill a sense of responsibility and a desire to succeed.
- To help students develop their ability to learn and to acquire effective work methods.
- To help students understand the underlying principles of various techniques.
- To help students develop the attitudes necessary for a successful professional life.
- To encourage students to strive for excellence.

To ensure job mobility.

- To help students develop a positive attitude toward technological change and new situations.
- To encourage further learning and research.
- To prepare students for a creative job search.

3. COMPETENCIES

The competencies to be developed in the *Home Electronic Equipment Repair and Installation* 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 (Δ) indicates a correlation between a specific competency and a step in the work process. The symbol ($\bigcirc$) indicates a correlation between a general and a specific competency.

The symbols ($\blacktriangle$) and ($\bullet$) 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			FIRST-LEVEL OPERATIONAL OBJECTIVES	DURATION (IN HOURS)	WORK PROCESS (major steps)														GENERAL COMPETENCIES (technology, personal development, etc.)																	TOTALS							
HOME ELECTRONIC EQUIPMENT REPAIR AND INSTALLATION					Plan the work	Diagnose the problem	Estimate the cost	Do the work	Check the quality of the work	Issue the invoice	Apply occupational health and safety rules	Analyze a direct-current circuit	Analyze an alternating-current circuit	Use measuring instruments	Use plans and service manuals	Analyze solid-state circuits	Analyze a power supply circuit	Apply concepts of management and human relations	Apply techniques for replacing and repairing components	Analyze an audio circuit	Apply principles of audio recording and playback	Apply principles of combinational logic	Apply principles of sequential logic	Analyze microprocessors and interface circuits	Apply principles of radio communications	Analyze radio circuits	Apply principles of monochrome television	Analyze a tuning circuit	Analyze a video circuit	Analyze a horizontal deflection circuit	Apply principles of colour television	Analyze the chrominance and luminance circuits of a television receiver	Analyze an information processing and character generating circuit	Make house calls	Use job-search techniques	Show concern for the cleanliness of the work area	Use the appropriate terminology	Communicate in French	NUMBER OF OBJECTIVES	DURATION (IN HOURS)			
SPECIFIC COMPETENCIES (directly related to the practice of the specific occupation)																																											
MODULES										2	3	4	5	6	7	8	9	10	11	12	14	15	16	18	19	23	24	25	26	30	31	32	35	36									
FIRST-LEVEL OPERATIONAL OBJECTIVES										B1	B1	B1	B1	B1	B1	B1	S1	B2	B2	B2	B2	B2	B3	B3	B3	B3	B3	B3	B4	B4	B4	B4	B4	S4	*	*	*		25				
DURATION (IN HOURS)										30	90	75	45	30	90	60	15	45	45	45	45	60	90	60	60	75	30	30	30	60	45	45	30	15							1245		
1	Determine their suitability for the trade and the training process	S1	15																																								
13	Repair a piece of analog audio equipment	B2	60	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●	●		●	●	●	●	●	●																				
17	Repair a piece of digital audio equipment	B2	60	▲	▲	▲	▲	▲	▲	○	○	○	○	●	●	○		●	○	●	●	●																					
20	Repair radios	B3	60	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●	○	●	●	○		●	●	●	●	●		●						●		●	●	●						
21	Repair telephones	B3	30	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●	●	●	●	○		○	○	○	●	●		○									●	●	●	●				
22	Repair a microwave oven	B3	30	▲	▲	▲	▲	▲	▲	●	●	●	●	●	●	●	●	●	○		○	○	○	○	○								●		●	●	●						
27	Repair a monochrome monitor	B3	45	▲	▲	▲	▲	▲	▲	●	○	○	○	●	●	●		●	○		●	●	●	●	●	●	●	●	●														
28	Repair a monochrome television receiver	B4	45	▲	▲	▲	▲	▲	▲	●	○	○	○	●	●	●	●	●	○		○	○	●	●	●	●	●	●	●			○	●		●	●	●	●					
29	Install audio-visual receivers	B4	60	▲	▲	▲	▲	▲	▲	●	○	○	●	●			●							○									●		●	●	●						
33	Integrate into the labour market	S4	60	▲	▲	▲	▲	▲	▲	●	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●		●	●	●					
34	Repair a colour television receiver	B4	90	▲	▲	▲	▲	▲	▲	●	○	○	○	○	○	○	●	○	○		●	●	●	●	●	○	●	●	●	●	●	●	●		●	●	●						
NUMBER OF OBJECTIVES			11																																					36			
DURATION (IN HOURS)				555																																						1800	

S: Situational objective
B: Behavioural objective

▲ Correlation between a step and a specific competency
▲ Correlation to be taught and evaluated

○ Correlation between a general and a specific competency
● Correlation to be taught and evaluated

BLOCKS

4. GENERAL OBJECTIVES

The general objectives of the *Home Electronic Equipment Repair and Installation* 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.
- Integrate into the labour market.
- Use job-search techniques.

To develop in the students the basic competencies needed to practise the trade in the workshop and in the client's home.

- Apply occupational health and safety rules.
- Apply concepts of management and human relations.
- Make house calls.
- Repair a piece of analog audio equipment.
- Repair a piece of digital audio equipment.
- Repair radios.
- Repair telephones.
- Repair a monochrome television receiver.
- Repair a monochrome monitor.
- Install audio-visual receivers.
- Repair a colour television receiver.
- Repair a microwave oven.

To develop in the students the basic competencies needed to perform the tasks involved in the trade.

- Analyze a direct-current circuit.
- Analyze an alternating-current circuit.
- Use measuring instruments.
- Use plans and service manuals.
- Analyze solid-state circuits.
- Analyze a power supply circuit.
- Apply techniques for replacing and repairing components.
- Analyze an audio circuit.
- Apply principles of audio recording and playback.
- Apply principles of combinational logic.
- Apply principles of sequential logic.
- Analyze microprocessors and interface circuits.

To develop in the students the specific competencies required to repair and install radio and television receivers.

- Apply principles of radio communications.
- Apply principles of monochrome television.
- Analyze a tuning circuit.
- Analyze a video circuit.
- Analyze a horizontal deflection circuit.
- Apply principles of colour television.
- Analyze the chrominance and luminance circuits of a television receiver.
- Analyze an information processing and character generating circuit.
- Analyze radio circuits.

5. FIRST- AND SECOND-LEVEL OPERATIONAL OBJECTIVES

5.1 DEFINITION

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 fosters 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.

Second-level operational objectives are intermediate teaching/learning targets deemed prerequisite for attaining first-level objectives. They are grouped according to the specifications (see 5.2 A) or the phases (see 5.2 B) of the first-level objective.

The division of operational objectives into first- and second-level objectives is based on a clear distinction between the levels of learning:

- learning involving prerequisite knowledge
- learning involving competencies

Second-level operational objectives indicate prerequisite knowledge. They prepare the students to learn what is necessary to attain the first-level operational objectives, which collectively lead to the development of a competency. The objectives should always be adapted to meet the particular needs of the individual students or groups of students.

First-level operational objectives cover the learning that the students need to develop a competency:

- The specifications or the phases of the objective determine or guide specific learning, thereby allowing the competency to be developed step by step.

- The objective as a whole (i.e. the six components and in particular the last phase of a situational objective) determines or guides the overall learning and the integration and synthesis of this learning, allowing the competency to be developed fully.

To attain the objectives, the following learning activities may be prepared:

- specific learning activities for second-level objectives
- specific learning activities for the specifications or phases of first-level objectives
- general learning activities for first-level objectives

5.2 HOW TO READ FIRST-LEVEL OPERATIONAL OBJECTIVES

A. How to Read a Behavioural Objective

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

1. 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.
2. 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.
3. 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:

4. The **specifications of the expected behaviour** describe the essential elements of the competency in terms of specific behaviours.
5. 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.
6. The **field of application** defines the limits of the objective, where necessary. It indicates cases where the objective applies to more than one task, occupation or field.

B. How to Read a Situational Objective

Situational objectives consist of six components:

1. The **expected outcome** states a competency as an aim to be pursued throughout the course.
2. The **specifications** outline the essential aspects of the competency and ensure a better understanding of the expected outcome.
3. The **learning context** provides an outline of the learning situation designed to help the students develop the required competencies. It is normally divided into three phases of learning:
 - information
 - performance, practice or involvement
 - synthesis, integration and self-evaluation
4. 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.
5. The **participation criteria** describe the requirements the students must fulfil, which are usually related to each phase of the learning context. They focus on how the students take part in the activities rather than on the results obtained. Participation criteria are normally provided for each phase of the learning context.
6. The **field of application** defines the limits of the objective, where necessary. It indicates cases where the objective applies to more than one task, occupation or field.

PART II

MODULE 1: THE TRADE AND THE TRAINING PROCESS

SIMCA: EDS-281
SESAME: 789-261

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 and the entrepreneurial opportunities it provides.
- Understand the training process.
- Confirm their career choice.

LEARNING CONTEXT

PHASE 1: Information on the Trade

- Learning about the job market in home electronic equipment repair and installation--work environments, types of establishments, products, job prospects, wages, opportunities for promotion or transfer, percentage of women workers, selection of candidates--through field trips, interviews, written material, etc.
- Learning about the nature and the requirements of the job--tasks, working conditions, evaluation criteria, rights and responsibilities of workers--through field trips, interviews, written material, etc.
- Becoming aware of the possibility of starting one's own business.
- During a group meeting, presenting the information gathered and discussing the students' views on the trade: advantages, disadvantages, requirements.

FIRST-LEVEL OPERATIONAL OBJECTIVE SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 2: Information on and Participation in the Training Program

- Discussing the skills, aptitudes and knowledge required to practise the trade.
- Learning about the training plan: program of study, training process, evaluation methods, certification of studies.
- Discussing how the training program relates to the work of a home electronic equipment repairer and installer.
- Discussing the students' initial reactions to the trade and the training program.

PHASE 3: Evaluation and Confirmation of Career Choice

- Producing a report in which the students must:
 - describe their preferences, aptitudes, and interests with respect to the trade
 - assess their career choice by comparing the different aspects and requirements of the trade with their own preferences, aptitudes and interests

INSTRUCTIONAL GUIDELINES

The teacher should:

- Create a climate that is conducive to personal growth and to the students' integration into the job market.
- Encourage all the students to engage in discussions and to express themselves.
- Motivate the students to take part in the suggested activities.
- Help the students to acquire an accurate perception of the trade.
- Provide the students with the means to assess their career choice honestly and objectively.
- Organize field trips to companies that are representative of the main work environments in the trade.
- Make available all pertinent documentation: information on the trade, the training program, guides, etc.
- Organize a meeting with specialists in the trade.

FIRST-LEVEL OPERATIONAL OBJECTIVE SITUATIONAL OBJECTIVE

PARTICIPATION CRITERIA

PHASE 1:

- Gather information on most of the topics to be dealt with.
- Express their views on the trade in a group meeting, relating them to the information they have gathered.

PHASE 2:

- Give their opinions on some of the requirements that they will have to meet in order to practise the trade.
- Examine carefully the literature provided.
- Listen carefully to the explanations.
- Express their views on the training program clearly in a group meeting.
- Express their reactions clearly.

PHASE 3:

- Write a report that:
 - sums up their preferences, interests and aptitudes
 - explains how they arrived at their career choice, relating it to their preferences, interests and aptitudes

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before undertaking the activities in each of the phases:

1. Be receptive to information about the trade and the training program.
2. Be willing to share their views on the trade with other members of the group.

Before undertaking the activities of Phase 1:

3. Find the appropriate information.
4. Determine how to record and present information.
5. Distinguish between "task" and "job."
6. Give the meaning of "entry-level qualifications."
7. Explain the main rules governing group discussions.

Before undertaking the activities of Phase 2:

8. Differentiate among the skills, aptitudes and knowledge required to practise a trade.
9. Describe the nature, purpose and content of a program of study.

Before undertaking the activities of Phase 3:

10. Differentiate among preferences, aptitudes and interests.
11. Describe the main components of the report confirming their career choice.

MODULE 2: OCCUPATIONAL HEALTH AND SAFETY

SIMCA: BDD-282
SESAME: 842-052

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **apply occupational health and safety rules** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following specific instructions
- On the basis of relevant research
- In a simulated situation
- Using relevant resource material (e.g. laws, regulations, CSST documents)
- Using audio-visual reference material
- Referring to information on the school's established emergency procedures

GENERAL PERFORMANCE CRITERIA

- Understanding of relevant regulations
- Understanding and identification of the main aspects of occupational health and safety
- Accurate identification of the causes of industrial accidents and occupational diseases
- Accurate explanations

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|--|---|
| A. Explain some of the general principles of the <i>Act respecting occupational health and safety</i> (R.S.Q., chapter S-2.1). | - Accurate knowledge of the rights and obligations of workers |
| B. Explain some of the principal regulations respecting the quality of the work environment (S-2.1, r.15) and industrial and commercial establishments (S-2.1, r.9). | - Unequivocal understanding of the regulations |
| C. Identify the most frequent causes of accidents in the trade. | - Correlation established between tasks specific to the trade and the most frequent types of accidents |
| D. Describe various occupational situations that involve the use of the most common pollutants. | <ul style="list-style-type: none"> - Accurate correlation established between occupational situations and the presence of various pollutants - Understanding of material safety data sheets (WHMIS) |
| E. Identify the safety measures specific to the trade and the work environment. | - Accurate knowledge of personal and general safety measures in the workplace |
| F. Explain the principles related to the safe layout of a specific work area such as a workshop or a laboratory. | - Satisfactory understanding of the safety principles related to the layout of work areas |
| G. Explain the major steps in an emergency procedure for dealing with accidents. | <ul style="list-style-type: none"> - Accurate knowledge of the major steps - Logical sequence of steps |

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to explain some of the general principles of the *Act respecting occupational health and safety* (R.S.Q., chapter S-2.1) (A):

1. Recognize the importance of prevention.
2. Be familiar with industrial accident statistics.
3. Recognize the importance of making employers aware of occupational health and safety concerns.

Before learning how to explain some of the principal regulations respecting the quality of the work environment (S-2.1, r.15) and industrial and commercial establishments (S-2.1, r.9) (B):

4. Be familiar with the recourses available to workers with regard to occupational health and safety.

Before learning how to identify the most frequent causes of accidents in the trade (C):

5. Describe various means of promoting accident prevention in the workplace.

Before learning how to describe various occupational situations that involve the use of the most common pollutants (D):

6. Describe various factors that affect health in the workplace.
7. Name various pollutants used in the trade (e.g. greases, oils, solvents).
8. Describe methods of disposing of pollutants.
9. List various means of preventing occupational diseases.

Before learning how to identify the safety measures specific to the trade and the work environment (E):

10. Recognize the importance of keeping the work area clean.
11. List personal and general safety measures (e.g. wearing goggles and protective footwear, using safety locks).
12. Describe various ergonomic positions.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to explain the principles related to the safe layout of a specific work area such as a workshop or a laboratory (F):

13. Describe the main rules of fire prevention.

Before learning how to explain the major steps in an emergency procedure for dealing with accidents (G):

14. Recognize the importance of being familiar with emergency procedures.
15. Be familiar with the emergency procedure of the school.
16. Be familiar with the main rescue procedures for the most common accidents.

MODULE 3: ANALYZING DC CIRCUITS

SIMCA: ECF-281
SESAME: 786-056

Duration: 90 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **analyze a direct-current circuit** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using the circuit diagram of a series-parallel circuit containing six resistors and a source

GENERAL PERFORMANCE CRITERIA

- Observance of health and safety rules
- Appropriate use of instruments and equipment
- Clean, careful work
- Structured work method

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Interpret the circuit diagram.
- B. Solve for all values in the circuit.
- C. Measure all values in the circuit.
- D. Justify the results.

SPECIFIC PERFORMANCE CRI- TERIA

- Use of appropriate terminology
- Accurate interpretation of symbols and conventions
- Correct application of laws
- Accurate calculations
- Accurate measurements
- Systematic observance of safety measures
- Accurate calculation of differences
- Acceptable list of causes of differences

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the circuit diagram (A):

1. Describe the atomic structure of matter.
2. Describe the methods of producing electricity.
3. Identify the characteristics of direct-current circuit components (sources, resistors, capacitors, inductors).
4. Recognize the different arrangements of components.

Before learning how to solve for all values in the circuit (B):

5. Explain Ohm's law and Watt's law.
6. Describe the characteristics of direct-current circuits.
7. Describe the characteristics of RC and RL time constants in circuits.
8. Simplify circuits.

Before learning how to measure all values in the circuit (C):

9. Test the components of the circuits.
10. Assemble circuits.
11. Describe the characteristics of direct-current measuring meters.
12. Connect measuring meters to a circuit correctly.
13. Interpret meter scale readings.

Before learning how to justify the results (D):

14. Identify possible causes of error in measurement.
15. Define the internal resistance of a source.

MODULE 4: ANALYZING AC CIRCUITS

SIMCA: ECF-287
SESAME: 786-115

Duration: 75 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **analyze an alternating-current circuit** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using diagrams of circuits consisting of one resistor, one inductor and one capacitor connected in series or in parallel with a source

GENERAL PERFORMANCE CRITERIA

- Observance of health and safety rules
- Proper use of tools, equipment (assembly benches) and instruments
- Clean, careful work
- Structured work methods

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Interpret the circuit diagram.
- B. Solve for all values in the circuit.
- C. Measure all values in the circuit.
- D. Justify the results.

SPECIFIC PERFORMANCE CRI- TERIA

- Use of appropriate terminology
- Accurate interpretation of symbols and conventions
- Correct application of laws
- Accurate calculations
- Accurate measurements
- Systematic observance of personal and general safety measures
- Accurate calculation of differences
- Acceptable list of causes of differences

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the circuit diagram (A):

1. Explain the production of a sine wave.
2. Define the terms associated with alternating current.
3. Describe the characteristics of inductors in alternating-current circuits.
4. Describe the characteristics of capacitors in alternating-current circuits.
5. Describe the characteristics of transformers.

Before learning how to solve for all values in the circuit (B):

6. Describe the characteristics of alternating-current circuits.
7. Differentiate among the terms *resistance*, *reactance* and *impedance*.
8. Draw phasor diagrams.
9. Calculate the value of a sine wave.
10. Differentiate among the terms *real power*, *reactive power*, *apparent power* and *power factor*.
11. Describe the characteristics of resonant series and parallel circuits.
12. Test the components of a circuit.

Before learning how to measure all values in the circuit (C):

13. Describe the safety measures to be applied when connecting measuring meters and taking readings.
14. Assemble circuits.
15. Use alternating-current measuring meters.
16. Interpret meter scale readings.

Before learning how to justify the results (D):

17. Identify possible causes of error in measurement.

MODULE 5: MEASURING INSTRUMENTS

SIMCA: EDS-282
SESAME: 789-273

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **use measuring instruments** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using two copies of a circuit diagram
- Working on a pre-assembled series circuit consisting of one resistor, one capacitor, one inductor, a variable frequency AC source and a circuit board
- Using a multimeter and an oscilloscope

GENERAL PERFORMANCE CRITERIA

- Satisfactory use of instruments
- Proper sequence of operations
- Accurate measurements
- Use of instruments in conformity with manufacturers' recommendations

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Choose the measuring instruments and probes.
- B. Adjust the instruments.
- C. Connect the measuring instruments.
- D. Take meter readings.

SPECIFIC PERFORMANCE CRI- TERIA

- Appropriate choice of instruments and probes
- Use of appropriate adjustment technique
- Selection of appropriate range
- Selection of appropriate function
- Choice of appropriate measuring points
- Correct types of connections:
 - parallel
 - series
- Accurate readings and representation of signals measured

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to choose the measuring instruments and probes (A):

1. Identify the terms *resistance, capacitance, inductance, current, frequency and period, peak-to-peak voltage, rms voltage, time base*.
2. Describe the main reasons for measuring with instruments.
3. Recognize measuring instruments, their purpose and their characteristics.
4. Compare digital meters with analog meters.
5. State the characteristics and uses of various probes and accessories.
6. Determine the range of various measuring instruments.
7. State the types of measurements that can be made in an electronic circuit.

Before learning how to adjust the instruments (B):

8. Differentiate between *calibration* and *adjustment*.
9. State the purpose of adjusting measuring instruments and the consequences of poor adjustment.
10. Recognize the adjustments to be made to instruments.
11. Describe the techniques for adjusting various instruments.
12. Describe the measuring ranges.

Before learning how to connect the measuring instruments (C):

13. Identify the main components of an electronic circuit.
14. Locate the main points in an electronic circuit where measurements may be made.
15. Describe the methods of connecting measuring instruments.
16. List the precautions to take when connecting measuring instruments.

Before learning how to take meter readings (D):

17. Explain the methods of reading various instruments.
18. List the evaluation criteria for accurate measurements.
19. Identify the main measurement errors and their causes.
20. Apply the mathematical formulas needed to use measuring instruments.

MODULE 6: PLANS AND SERVICE MANUALS

SIMCA: EDS-283
SESAME: 789-282

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **use plans and service manuals** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using service manuals for two different products with the same type of information (at least one should contain a simple logic diagram)
- Using copies of the schematic diagram and of the mechanical assembly drawing (exploded view)

GENERAL PERFORMANCE CRITERIA

- Conformity to instructions
- Efficient use of service manual
- Careful use of material

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|--|---|
| A. Select the service manual. | <ul style="list-style-type: none"> - Optimal use of available information - Structured work method |
| B. Interpret the safety measures. | <ul style="list-style-type: none"> - Accurate location of safety measures - Accurate identification of safety symbols - Correct association of particular safety measures with various tasks |
| C. Interpret the data sheets. | <ul style="list-style-type: none"> - Accurate identification of data sheet - Accurate identification of sections of data sheet - Precise information located |
| D. Interpret the schematic diagrams. | <ul style="list-style-type: none"> - Accurate identification of the schematic diagrams for each section of the piece of equipment - Accurate identification of symbols and conventions - Accurate interpretation of legend |
| E. Interpret the mechanical assembly drawing. | <ul style="list-style-type: none"> - Accurate location of assembly drawing - Accurate location of parts on the assembly drawing - Accurate identification of main assembly pins |
| F. Identify information on the parts list. | <ul style="list-style-type: none"> - Accurate location of parts list - Accurate identification of manufacturer's part number |
| G. Interpret the repair and adjustment procedures. | <ul style="list-style-type: none"> - Accurate location of repair and adjustment procedures |

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRI- TERIA
H. File the plan and the service manual.	- Filing in conformity with system

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to select the service manual (A):

1. List the main types of home electronic equipment.
2. Recognize the importance of obtaining information relevant to the task at hand.
3. Determine the various methods used to obtain technical documentation.
4. State the general purpose, content and format of a plan.
5. Identify the various current service manuals, describing their usefulness, general content and usual organization.
6. Interpret the rating plate of a piece of equipment.

Before learning how to interpret the safety measures (B):

7. Recognize dangerous situations and products.
8. Identify the general content of safety measures.

Before learning how to interpret the data sheets (C):

9. Use English and French terminology specific to the trade.
10. List the general information contained on a data sheet.

Before learning how to interpret the schematic diagrams (D):

11. State the purpose of a plan.
12. Determine the general information contained in a plan.

Before learning how to interpret the mechanical assembly drawing (E):

13. Determine the usefulness of a mechanical assembly drawing.
14. Practise reading exploded views.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to identify information on the parts list (F):

15. List the components of a parts list.
16. Identify the various parts codes.
17. Determine the usefulness of a list of mechanical, electrical and electronic parts.

Before learning how to interpret the repair and adjustment procedures (G):

18. Recognize the main procedures described in a service manual.
19. Read an algorithm.

Before learning how to file the plan and the service manual (H):

20. Identify the most common filing methods.
21. List the precautions to take when filing plans and service manuals.

MODULE 7: SOLID-STATE CIRCUITS

SIMCA: ECI-284
SESAME: 843-076

Duration: 90 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **analyze solid-state circuits** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using data sheets for electronic and optoelectronic devices
- Using circuit diagrams
- Using basic power supply, amplifier and oscillator circuits
- Using electronic and optoelectronic devices
- Using the appropriate tools and instruments

GENERAL PERFORMANCE CRITERIA

- Observance of health and safety rules
- Appropriate use of tools and instruments
- Use of appropriate terminology
- Expected result: accurate interpretation of the characteristics and values of the circuits

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|---|---|
| A. Explain the function of diodes, transistors and integrated circuits. | <ul style="list-style-type: none"> - Accurate explanation of functions - Use of appropriate terminology |
| B. Interpret basic circuit diagrams: <ul style="list-style-type: none"> • power supply circuits • amplifier circuits • oscillator circuits | <ul style="list-style-type: none"> - Correct identification of components and characteristics of their parameters - Accurate identification of the function of circuits |
| C. Select electronic and optoelectronic devices. | <ul style="list-style-type: none"> - Choice of appropriate devices - Characteristics taken into account |
| D. Apply occupational health and safety rules. | <ul style="list-style-type: none"> - Systematic observance of personal and group safety measures |
| E. Measure and calculate the values of circuits. | <ul style="list-style-type: none"> - Accurate measurements and calculations |
| F. Diagnose circuit problems. | <ul style="list-style-type: none"> - Accurate diagnosis - Accurate identification of corrective measures |
| G. Clean up the work area. | <ul style="list-style-type: none"> - Clean work area and proper storage of components |

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to explain the function of diodes, transistors and integrated circuits (A):

1. Describe the basic characteristics of semiconductor materials.
2. Describe the characteristics of bipolar transistors.
3. Describe the characteristics of field-effect transistors.
4. Describe the characteristics of linear integrated circuits.
5. Describe the characteristics of regulatory circuits.
6. Describe the characteristics of operational amplifiers.

Before learning how to interpret basic circuit diagrams:

- power supply circuits
- amplifier circuits
- oscillator circuits (B):

7. Describe the functions of rectifier circuits.
8. Describe the functions of filters.
9. Explain the operation of power packs.
10. Explain the operation of amplifier circuits.
11. Explain the operation of oscillator circuits.
12. Interpret solid-state circuit diagrams.

Before learning how to select electronic and optoelectronic devices (C):

13. Identify the two basic categories of optoelectronic devices.
14. Be familiar with the terminology and units of measure related to optoelectronic devices.
15. Be familiar with the most common electronic devices.
16. Identify and measure the main characteristics of light.
17. Distinguish between the two main techniques for measuring the properties of light.
18. Identify the basic function of light-detection devices.
19. Identify the operating principle of four light-sensitive devices.
20. Describe the basic principle of light-emitting diodes.
21. Describe the construction of a light-emitting diode.
22. Name the advantages of light-emitting diodes over other sources of light.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

- 23. Describe the operating principle of a liquid crystal display.**
- 24. Describe the construction of a liquid crystal display.**

Before learning how to apply occupational health and safety rules (D):

- 25. Explain the usefulness of the main health and safety rules.**

Before learning how to measure and calculate the values of circuits (E):

- 26. Use measuring instruments.**
- 27. Calculate and measure the values of power supply circuits.**
- 28. Calculate and measure the values of amplifier circuits.**
- 29. Calculate and measure the values of oscillator circuits.**

Before learning how to diagnose circuit problems (F):

- 30. Interpret the input and output parameters of various circuits.**
- 31. Test solid-state devices.**

Before learning how to clean up the work area (G):

- 32. List the operations necessary for regular preventive maintenance of control instruments and equipment.**

MODULE 8: POWER SUPPLY CIRCUITS

SIMCA: EDQ-281
SESAME: 789-104

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using the circuit diagram
- Using a power source
- Using data sheets
- Using the necessary tools and measuring instruments
- Analyzing a regulated power supply circuit

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Use of proper procedure
- Proper use of tools and measuring instruments
- Use of appropriate terminology

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|--|--|
| A. Interpret the circuit diagram and assembly. | <ul style="list-style-type: none"> - Accurate interpretation of symbols, codes and conventions - Accurate location of sections: <ul style="list-style-type: none"> • rectifier • filter • regulator • switching circuit - Accurate location of components in diagram and circuit |
| B. List the characteristics of the components of the circuit. | <ul style="list-style-type: none"> - Detailed list of the characteristics of the main components: <ul style="list-style-type: none"> • rectifier • filter • regulator • switching circuit |
| C. List the electrical specifications. | <ul style="list-style-type: none"> - Precise list of specified values: <ul style="list-style-type: none"> • output voltage range • output current range • AC supply voltage • hum • percentage of load regulation • operating temperature |
| D. Evaluate the effects of various controls and adjustments. | <ul style="list-style-type: none"> - Qualitative evaluation of controls and adjustments |
| E. Measure and compare performances of a power supply circuit. | <ul style="list-style-type: none"> - Specifications of circuit taken into account - Development of a complete measurement table - Accurate calculation of differences between measurements and data |
| F. Test the operation of the protection circuit. | <ul style="list-style-type: none"> - Observance of testing procedure - Accurate interpretation of results obtained |

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the circuit diagram and assembly (A):

1. Describe the purpose of power sources.
2. Distinguish between voltage regulation and current regulation.
3. Identify the various regulation procedures.
4. Identify the various stages of a power source and their roles.
5. Identify the general components of a power source and their functions.
6. Recognize the power supply circuit in a piece of equipment.

Before learning how to list the characteristics of the components of the circuits (B):

7. Identify the characteristics of the components of a regulated power supply circuit.

Before learning how to evaluate the effects of various controls and adjustments (D):

8. Define the purpose of adjustable components.

Before learning how to measure and compare performances of a power supply circuit (E):

9. Define the purpose of reference diodes.
10. Describe the role of the error amplifier in a feedback regulator.
11. Describe the role of an adjustable voltage divider in a feedback regulator.
12. Describe the operation of a regulator depending on the type of load.

Before learning how to test the operation of the protection circuit (F):

13. Identify the properties of the various types of fuses.
14. Describe the characteristics of a thermal circuit breaker.
15. Describe the operation of the electronic protection circuits of a regulated power supply circuit.

MODULE 9: MANAGEMENT AND HUMAN RELATIONS

SIMCA: EDS-284
SESAME: 789-301

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
apply concepts of management and human relations.

SPECIFICATIONS

At the end of this module, the students will:

- Be aware of the importance of communication in the trade.
- Have developed the skills required to communicate with co-workers and customers.
- Have developed the skills required to manage a service establishment.

LEARNING CONTEXT

PHASE 1: Awareness

- Explaining the need for management in any business.
- Listing the main sources of information on starting a service establishment.
- Listing the management requirements of a service establishment.
- Discussing human relations in the context of a service establishment.
- Recognizing desirable and undesirable behaviour and attitudes toward co-workers.
- Recognizing desirable and undesirable behaviour and attitudes toward customers (e.g. reception, appearance, politeness, use of simple language).

FIRST-LEVEL OPERATIONAL OBJECTIVE SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 2: Application

- Transmitting information on Québec laws and regulations (*Consumer Protection Act*).
- Applying management techniques for service establishments.
- Establishing cooperative relationships with co-workers.
- Participating in learning situations with classmates posing as customers.
- Experimenting with various techniques for greeting and approaching customers.
- Helping customers express their needs.
- Being attentive to customers' reactions.

PHASE 3: Perception and Evaluation of Their Ability

- Discussing the importance of communication in a service establishment.
- Recognizing their strengths and weaknesses in dealing with customers and co-workers.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Have students communicate with customers.
- Encourage the students to express their apprehensions about dealing with customers.
- Encourage the students to engage in discussions and to express themselves.
- Prepare various learning situations that reflect the actual conditions in service establishments.
- Consider videotaping the students in order to allow them to observe and evaluate their abilities, attitudes and behaviour.

FIRST-LEVEL OPERATIONAL OBJECTIVE SITUATIONAL OBJECTIVE

PARTICIPATION CRITERIA

PHASE 1:

- Participate actively in group discussions.
- Identify various ways of behaving with customers and co-workers.
- Examine various samples of forms (e.g. estimates, invoices, guarantees).

PHASE 2:

- Participate in learning situations reflecting the actual conditions in service establishments.
- Pay particular attention to technical terms and grammar.
- Express their opinion on the characteristics of professional relationships with customers.
- Express their opinion on the characteristics of professional relationships with co-workers.

PHASE 3:

- Write a report dealing with the following information:
 - the need for management in any business
 - management requirements of a service establishment
 - their perception of communication in a service establishment
 - their ability to communicate with co-workers
 - their ability to communicate with customers
 - aspects of communication with customers and co-workers that need improving
 - their weaknesses in communicating with their co-workers
 - means of improving communication with co-workers
 - their weaknesses in communicating with customers
 - means of improving communication with customers
- Give an oral summary of their report.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before undertaking the activities of Phase 1:

1. Be receptive to the management requirements of a repair shop and to human relations at work.

Before undertaking the activities of Phase 2:

2. Be able to list the elements essential to the organization of a repair shop.
3. Recognize the importance of using precise but simple technical terms when dealing with customers.
4. Be able to value their work as specialists in their field.

Before undertaking the activities of Phase 3:

5. Show concern for offering constructive criticism to co-workers during group discussions.
6. Adopt a positive attitude toward co-workers' comments.
7. Show concern for improving their communication skills in the school as well as in the workplace.
8. Know how to observe their own behaviour with co-workers and customers.

MODULE 10: REPLACING COMPONENTS

SIMCA: EDS-285
SESAME: 789-293

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **apply techniques for replacing and repairing components** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using the service manual for the piece of equipment
- Working on a piece of electronic equipment
- Using the necessary tools, measuring instruments, equipment and solder
- Using replacement components
- Using chemicals

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Characteristics of the particular components taken into account
- Use of proper work methods
- Satisfactory selection and use of tools

**FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE**

**SPECIFICATIONS OF THE EXPECTED
BEHAVIOUR**

A. Replace an electronic component.

B. Repair a plastic component.

C. Replace a mechanical component.

**SPECIFIC PERFORMANCE CRI-
TERIA**

- Correct choice of replacement component
- Satisfactory desoldering
- Satisfactory selection and use of techniques
- Quality of joint
- Satisfactory operation and electrical continuity

- Satisfactory and safe use of products
- Solid bond
- Neat finished product

- Correct choice of replacement component
- Satisfactory use of tools
- Correct mechanical tensions
- Precise alignment of component
- Proper mechanical operation

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to replace an electronic component (A):

1. Consult the parts list and the manufacturers' literature.
2. List the effects of excessive heat on electronic components.
3. Describe the various techniques for soldering and desoldering, and removing and installing parts.
4. List the main products used in soldering and desoldering.
5. Identify the various tools and equipment required to replace electronic components.

Before learning how to repair a plastic component (B):

6. List the types of glue and solvents and their characteristics.
7. Identify the risks related to the use of these products and the precautions to be taken.
8. Describe the repairs usually made to plastic components.

Before learning how to replace a mechanical component (C):

9. Interpret the exploded view of the mechanical plan.
10. Identify the mechanical fasteners.
11. Use the main drilling, sawing, bending, threading and tapping methods.

MODULE 11: ANALYZING AUDIO CIRCUITS

SIMCA: EDS-286
SESAME: 789-313

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using the diagram of the piece of equipment and its service manual
- Using the appropriate tools and instruments
- Analyzing an audio amplifier equipped with the usual controls

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions
- Proper analytical procedure
- Use of appropriate terminology
- Observance of time limit

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Consult the service manual.
- B. Interpret the block and schematic diagrams of the piece of equipment.
- C. Measure the voltage gain of amplifier stages.
- D. Measure the characteristics of audio signal processing circuits.

SPECIFIC PERFORMANCE CRI- TERIA

- Location of precise information on the general characteristics of the circuit and its components
- Precise identification of the following elements on diagrams and in the piece of equipment:
 - each block
 - phono audio equalization circuits, balance control circuits, tone control circuits, equalizers
 - coupling methods
- Accurate readings
- Accurate calculations
- Accurate measurement of:
 - signal-to-noise ratio
 - tone control variation range
 - response curve
 - audio equalization
 - power gain

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to consult the service manual (A):

1. Describe the operating principle of an amplifier.
2. Define the main terms used in the trade.
3. Interpret the conventions, abbreviations and symbols specific to audio equipment.
4. Select the service manual.

Before learning how to interpret the block and schematic diagrams of the piece of equipment (B):

5. Identify the basic schematic diagrams for the various blocks in the block diagram.
6. Define the terms *polarization and generation, signal processing and signal paths*.
7. Distinguish, in a schematic diagram, between polarizing circuits and generating, signal processing and signal path circuits.
8. Describe different types of power amplifiers.
9. Identify the properties of a high-pass RC module.
10. Calculate the cutoff frequency of a high-pass RC module.
11. List the characteristics of a coupling transformer.
12. Distinguish between *impedance coupling and transformer coupling*.
13. Draw a schematic diagram of a simple RC equalizer for high and low audio frequencies.
14. Distinguish between linear control and logarithmic control.

Before learning how to measure the voltage gain of amplifier stages (C):

15. Locate, in the diagram, information pertaining to the voltage gain of amplifier stages.
16. Calculate base-10 logarithms.
17. List the characteristics of a Class A amplifying stage.
18. Describe the relationship between voltage gain and the value of the load resistor.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to measure the characteristics of audio signal processing circuits (D):

19. Describe the characteristics of the frequency response of the human ear.
20. Plot the response curve of an amplifying circuit and a filter circuit.
21. Describe the properties of LC circuits and list their main applications.

MODULE 12: AUDIO RECORDING AND PLAYBACK

SIMCA: EDS-287
SESAME: 789-323

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **apply principles of audio recording and playback** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using the reference manual, data sheets and diagrams for a tape recorder

GENERAL PERFORMANCE CRITERIA

- Conformity with instructions
- Observance of occupational health and safety rules
- Characteristics of the components of the piece of equipment taken into account
- Satisfactory selection and use of instruments

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Draw a simplified block diagram of an audio recording and playback system.
- B. Interpret the block diagram of a tape recorder.
- C. Evaluate the performance of the main transducers used to record and play back sound.
- D. Evaluate the quality of a recording according to the speeds used.

SPECIFIC PERFORMANCE CRI- TERIA

- Inclusion of main blocks illustrating:
 - transducers
 - processing elements of recording medium
 - playback processing elements
- Accurate interpretation of the role of each block:
 - mechanical section
 - electronic section
- Accurate interpretation of the pattern of the main transducers
- Accurate interpretation of the data sheets for the main transducers
- Acceptable evaluation of musical quality:
 - frequency response
 - noise
 - deterioration after numerous playbacks

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to draw a simplified block diagram of an audio recording and playback system (A):

1. Describe vibrating motion, wave motion and sound waves.
2. Define "high-fidelity."
3. Define "stereophony."

Before learning how to interpret the block diagram of a tape recorder (B):

4. Describe the operating principle of the tape recorder from the electrical and magnetic points of view.
5. Explain the operation of the main mechanical and electromechanical mechanisms of a tape recorder.
6. Explain the operation of the main electronic circuits in a tape recorder.
7. Determine the advantages and the consequences of increasing the number of tracks on a tape.
8. Define the "multiplayback" process.
9. Define the rerecording process.
10. Describe the process that makes print-through effects possible.

Before learning how to evaluate the performance of the main transducers used to record and play back sound (C):

11. Describe the main types of microphones.
12. Describe the main types of pickups.
13. Describe the main types of magnetic heads.
14. Define "decibel" and justify its usefulness as a comparative unit.
15. Describe the main types of speakers.
16. Define the characteristics of a speaker system.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to evaluate the quality of a recording according to the speeds used (D):

17. Describe the double-engraving stereo recording process.
18. Define the characteristics of the main elements of a manual turntable and an automatic turntable.
19. Identify the various materials in magnetic tape.
20. Describe the advantages of magnetic recording over recording on vinyl.
21. Describe the operating principle of a digital player.

MODULE 13: ANALOG AUDIO EQUIPMENT

SIMCA: EDS-288
SESAME: 789-334

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using the service manual and the data sheet for the piece of equipment
- Using replacement components
- Using the appropriate tools and measuring instruments
- Repairing a tape recorder or a stereo amplifier

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions
- Proper sequence of operations
- Use of appropriate disassembly and reassembly techniques
- Appropriate use of tools and equipment
- Clean, precise work

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|---|--|
| A. Evaluate the working condition of the piece of equipment. | <ul style="list-style-type: none"> - Relevant and complete information gathered on the history of the piece of equipment - Complete list of problems observed |
| B. Examine the piece of equipment and consult reference material. | <ul style="list-style-type: none"> - Satisfactory examination of components by sight, smell and touch - Accurate interpretation of troubleshooting procedure - Satisfactory and complete examination and research - Relevant interpretation of measurements made |
| C. Diagnose the problem. | <ul style="list-style-type: none"> - Accurate diagnosis - Determination of precise component to be replaced |
| D. Estimate the cost of repairs and the time required to make them. | <ul style="list-style-type: none"> - Satisfactory estimate of cost of parts - Satisfactory estimate of cost of repairs and the time required to make them |
| E. Make the necessary repairs. | <ul style="list-style-type: none"> - Correct choice of repairs - Satisfactory selection and use of equipment needed to make repairs - Quality of finished product |
| F. Make the required adjustments. | <ul style="list-style-type: none"> - Logical sequence of adjustments - Use of appropriate adjustment procedures - Precise adjustments in conformity with manufacturer's specifications |

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

G. Test the piece of equipment.

H. Issue the invoice.

SPECIFIC PERFORMANCE CRI- TERIA

- Absence of problems previously observed
- Acceptable overall operation

- Brief and precise information including:
 - identification of owner and piece of equipment
 - description of repairs
 - list of parts installed
- Accurate invoicing of parts and labour
- Accurate calculations

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to evaluate the working condition of the piece of equipment (A):

1. Describe the overall operation of a speaker, a turntable, a microphone and a tape recorder.
2. Describe the operating principle of an amplifier.
3. Interpret information contained in owner's manuals.
4. Determine the various problems that may arise with analog audio equipment and their symptoms.
5. List the main information contained in a service order.
6. Gather oral information by applying the general principles of human relations.

Before learning how to examine the piece of equipment and consult reference material (B):

7. Describe the various techniques for repairing equipment.
8. Describe the various sections of a speaker, a turntable, a microphone, a tape recorder and a stereo amplifier.
9. Describe the function of the various components of the equipment.
10. Interpret the data sheets for the equipment.

Before learning how to diagnose the problem (C):

11. Determine the causes of various possible problems.
12. Interpret the results of the examination and research.

Before learning how to estimate the cost of repairs and the time required to make them (D):

13. Interpret electrical and mechanical parts lists.
14. Consult manufacturers' and wholesalers' catalogues.
15. List the factors that influence the time required to repair a piece of equipment.
16. State the average hourly rate charged for repairs.
17. Be familiar with the main sections of the *Consumer Protection Act* regarding estimates and invoices.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to make the necessary repairs (E):

- 18. Compare replacement components with the original parts.
- 19. Be aware of the effect of heat on certain replacement components.
- 20. Protect the components and equipment against static electricity.
- 21. Master soldering and desoldering techniques.

Before learning how to make the required adjustments (F):

- 22. Identify the parts and sections to be adjusted.
- 23. List the tools and instruments required to make the adjustments.
- 24. Identify the test points and connect the measuring instruments.

Before learning how to test the piece of equipment (G):

- 25. Interpret the information on the data sheets that concerns the performance of the equipment.
- 26. Identify testing equipment.

Before learning how to issue the invoice (H):

- 27. List the factors that may influence the amount of time charged.
- 28. Identify the various taxes and their rates.
- 29. Make mathematical calculations related to invoicing.
- 30. Give a clear and concise oral explanation of the work.

MODULE 14: COMBINATIONAL LOGIC

SIMCA: BDE-289
SESAME: 842-213

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **apply principles of combinational logic** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using a system or assembly diagram
- Using manufacturers' manuals
- Using data sheets and following instructions
- Using logic components
- Using the appropriate tools and instruments
- Using wiring material

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Proper use of material
- Systematic work method
- Parameters of the circuit taken into account when switching on
- Operation in conformity with the diagrams
- Appropriate interpretation of symbols

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|---|---|
| A. Apply principles of Boolean algebra. | - Observance of rules |
| B. Convert numbers from one base to another. | - Accurate conversions |
| C. Construct truth tables. | <ul style="list-style-type: none"> - Construction according to the rules - Accurate results |
| D. Reduce equations using a Karnaugh map. | <ul style="list-style-type: none"> - Reduction of equations with a maximum of four variables - Accurate results |
| E. Adopt occupational health and safety measures. | - Observance of safety measures |
| F. Assemble basic circuits. | <ul style="list-style-type: none"> - Circuits in conformity with diagrams and instructions - Neat presentation |
| G. Repair circuits. | <ul style="list-style-type: none"> - Conformity with information contained in the diagram and instructions - Appropriate selection and use of measuring instruments |
| H. Clean up the work area. | <ul style="list-style-type: none"> - Neatness of work area and proper storage of components |

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to apply principles of Boolean algebra (A):

1. Define the various laws of Boolean algebra.

Before learning how to convert numbers from one base to another (B):

2. Solve conversion problems in various number systems.

Before learning how to construct truth tables (C):

3. Be familiar with the various cells or components.
4. Explain the construction of their truth table and its operation.

Before learning how to reduce equations using a Karnaugh map (D):

5. Explain Karnaugh's rules.
6. Write equations based on groups.
7. Translate equations into diagrams.

Before learning how to adopt occupational health and safety measures (E):

8. Explain the usefulness of the main health and safety rules.

Before learning how to assemble basic circuits (F) and to repair circuits (G):

9. Disassemble and reassemble components.

Before learning how to clean up the work area (H):

10. List the operations necessary for cleaning up the work area.

MODULE 15: SEQUENTIAL LOGIC

SIMCA: BDF-289
SESAME: 842-304

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **apply principles of sequential logic** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using reference manuals
- Using manufacturers' data sheets
- Using a system diagram and following instructions
- Using logic components
- Using the appropriate tools and instruments
- Using wiring material

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Neat presentation of circuits or diagrams
- Proper use of material
- Observance of the parameters of the circuit when switching on
- Operation in conformity with diagrams

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Select the various components.

B. Draw diagrams.

C. Apply occupational health and safety rules.

D. Assemble circuits.

E. Repair circuits.

F. Clean up the work area.

SPECIFIC PERFORMANCE CRI- TERIA

- Appropriate selection of components based on their application
- Neatness of diagrams
- Observance of rules
- Proper sequence of steps
- Observance of safety measures
- Circuits in conformity with diagrams and instructions
- Characteristics of components taken into account
- Proper operation of circuit
- Circuits in conformity with diagrams and normal operating conditions
- Appropriate selection and use of measuring meters
- Quality of repair
- Neatness of work area and proper storage of components

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to select the various components (A):

1. Interpret the symbols.
2. Identify the components.
3. Describe the roles of various components.

Before learning how to draw diagrams (B):

4. Describe the various start, stop and run modes.

Before learning how to apply occupational health and safety rules (C):

5. Explain the main occupational health and safety rules.

Before learning how to assemble circuits (D):

6. Use tools and equipment correctly and carefully.
7. Install the components correctly.
8. Ensure that the components are in good working order.

Before learning how to repair circuits (E):

9. Adjust the various parameters of the circuits correctly.
10. Detect one or several problems.
11. Ensure that the components are in good working order.

Before learning how to clean up the work area (F):

12. List the operations necessary for cleaning up the work area.

MODULE 16: MICROPROCESSORS

SIMCA: EDQ-286
SESAME: 789-156

Duration: 90 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **analyze microprocessors and interface circuits** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using plans and data sheets
- Using connection diagrams
- Using truth tables
- Using timing diagrams
- Using circuit diagrams
- Using microprocessors and interfaces
- Using test benches or industrial equipment
- Using electronic equipment
- Using the appropriate tools and measuring instruments
- Using software

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Appropriate use of tools and measuring instruments
- Use of appropriate terminology
- Use of proper work methods and procedures
- Careful handling of diagrams, service manuals and technical documents
- Observance of operating parameters

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|---|---|
| A. Explain the operating principle of microprocessors. | <ul style="list-style-type: none"> - Accurate description of the roles of the various blocks - Accurate description of the connections between the registers |
| B. Identify control signals in microprocessor systems. | <ul style="list-style-type: none"> - Accurate identification of control signals - Appropriate use of measuring instruments - Accurate evaluation of timing |
| C. Test a memory circuit. | <ul style="list-style-type: none"> - Accurate identification of type of memory - Accurate determination of required signals - Use of proper programming procedure |
| D. Apply the operating principles of input and output interfaces. | <ul style="list-style-type: none"> - Understanding of the operating principles - Operation in conformity with instructions |
| E. Test input and output interface circuits. | <ul style="list-style-type: none"> - Accurate interpretation of diagrams - Accurate interpretation of control software - Appropriate use of measuring instruments - Use of proper testing procedure |

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to explain the operating principle of microprocessors (A):

1. Identify the main blocks of a microprocessor environment.
2. Define *standard microprocessor*.
3. Define *dedicated microprocessor*.
4. Describe the role of the main blocks of a standard microprocessor.
5. Identify the main blocks of a dedicated microprocessor.
6. State the functions of a microprocessor.
7. List the power characteristics of a microprocessor.
8. Describe the fetch-execute cycle.
9. Distinguish between the role of software and the role of hardware.
10. List the main programming languages.

Before learning how to identify control signals in microprocessor systems (B):

11. Identify the various control lines.
12. Identify the functions of each control line.
13. Evaluate signal dephasing.

Before learning how to test a memory circuit (C):

14. Be familiar with the main sources of information on memory.
15. Explain the operating principle of each of the main types of memory.
16. Describe the main methods of erasing memory.
17. Represent memory groups on a block diagram.
18. Describe the construction of an address decoder.

Before learning how to apply the operating principles of input and output interfaces (D):

19. Identify the various peripherals.
20. Identify the various input and output ports.
21. State the characteristics of the RS 232 serial port.
22. Distinguish between the PIA and the UART.
23. Explain the operation of a PIA.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to test input and output interface circuits (E):

- 24. Describe the operation of display control circuits.
- 25. Describe the operation of decoding a keyboard.
- 26. List several types of analog-to-digital converters and digital-to-analog converters.
- 27. Describe the operation of analog-to-digital converter circuits.
- 28. Describe the operation of digital-to-analog converter circuits.

MODULE 17: DIGITAL AUDIO EQUIPMENT

SIMCA: EDS-289
SESAME: 789-344

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using the service manual and the data sheet for the piece of equipment
- Using digital replacement components
- Using the appropriate tools and measuring instruments
- Repairing a digital disk player

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions
- Proper sequence of operations
- Use of appropriate disassembly and reassembly techniques
- Appropriate use of tools and equipment
- Clean, precise work

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|---|--|
| A. Evaluate the working condition of the piece of equipment. | <ul style="list-style-type: none"> - Relevant and complete information gathered on the history of the piece of equipment - Complete list of problems observed |
| B. Examine the piece of equipment and consult reference material. | <ul style="list-style-type: none"> - Accurate interpretation of troubleshooting procedure - Satisfactory and complete examination and research - Relevant interpretation of polarity measurements - Relevant interpretation of interface signal tables |
| C. Diagnose the problem. | <ul style="list-style-type: none"> - Accurate diagnosis - Determination of precise component to be replaced |
| D. Estimate the cost of repairs and the time required to make them. | <ul style="list-style-type: none"> - Satisfactory estimate of cost of parts - Satisfactory estimate of cost of repairs and the time required to make them |
| E. Make the necessary repairs. | <ul style="list-style-type: none"> - Correct choice of repairs - Satisfactory selection and use of equipment needed to make repairs - Quality of finished product |
| F. Make the required adjustments. | <ul style="list-style-type: none"> - Logical sequence of adjustments - Use of appropriate adjustment procedures - Precise adjustments in conformity with manufacturer's specifications |

**FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE**

**SPECIFICATIONS OF THE EXPECTED
BEHAVIOUR**

G. Test the piece of equipment.

H. Issue the invoice.

**SPECIFIC PERFORMANCE CRI-
TERIA**

- Absence of problems previously observed
- Electronic performance in conformity with data sheet
- Mechanical movement in conformity with manufacturer's descriptions

- Brief and precise information including:
 - identification of owner and piece of equipment
 - description of repairs
 - list of parts installed
- Accurate invoicing of parts and labour
- Accurate calculations

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to evaluate the working condition of the piece of equipment (A):

1. Describe the operating principles of a digital disk player.
2. Interpret the warnings regarding the use and transportation of the piece of equipment.
3. Interpret information contained in owner's manuals.
4. Determine the various problems that may arise with digital audio equipment and their symptoms.
5. List the main information contained in a service order.
6. Gather oral information by applying the general principles of human relations.

Before learning how to examine the piece of equipment and consult reference material (B):

7. Describe the various techniques for repairing equipment.
8. Identify the various sections and components of a digital disk player, using a block diagram.
9. Describe the function of the various sections and components of the piece of equipment.

Before learning how to diagnose the problem (C):

10. Determine the causes of various possible problems.
11. Interpret the results of the examination and research.

Before learning how to estimate the cost of repairs and the time required to make them (D):

12. Interpret parts lists.
13. Consult manufacturers' and wholesalers' catalogues.
14. Follow the manufacturers' recommendations concerning critical parts.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to make the necessary repairs (E):

15. Interpret exploded views of the piece of equipment.
16. Compare replacement components with the original parts.
17. Be aware of the effect of heat on certain replacement components.
18. Apply measures to protect components and equipment against static electricity.
19. Master soldering and desoldering techniques.

Before learning how to make the required adjustments (F):

20. Identify the parts and sections to be adjusted.
21. Interpret the tables concerning the preliminary adjustment of the main controls after replacing parts.
22. List the main adjustments to be made to a digital disk player and the instruments required to make these adjustments.
23. Locate the adjustable components on the printed circuits.

Before learning how to test the piece of equipment (G):

24. Describe the sequence of movements of each mechanism according to its function.
25. Test the piece of equipment to ensure that it will not cause electric shock.
26. Test the piece of equipment.

Before learning how to issue the invoice (H):

27. List the factors that may influence the amount of time charged.
28. Identify the various taxes and their rates.
29. Make mathematical calculations related to invoicing.
30. Give a clear and concise oral explanation of the work done.

MODULE 18: PRINCIPLES OF RADIO COMMUNICATIONS

SIMCA: EDT-281
SESAME: 789-354

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **apply principles of radio communications** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using reference manuals for antennas and transmission lines

GENERAL PERFORMANCE CRITERIA

- Conformity with instructions
- Use of appropriate terminology

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Draw a block diagram of a radio communications system.

B. Analyze the block diagrams of the two main types of transmitters: AM and FM (multiplex).

C. Establish a comparative table of AM and FM systems.

SPECIFIC PERFORMANCE CRI- TERIA

- Main blocks of transmitter included:
 - preamplifier
 - audio amplifier
 - oscillator
 - modulator
 - HF power amplifier
- Elements required to transmit signals included:
 - electromagnetic waves
 - transmitting and receiving antennas
 - transmission lines
- Main blocks of receiver included:
 - tuner
 - HF amplifier
 - demodulator
 - audio amplifier
- Accurate interpretation of the role of each block
- Accurate interpretation of the connections between the blocks
- Accurate determination of the shape of the modulated wave envelope
- Identification of precise role of amplitude and frequency of modulating signal for each type of modulation
- Complete list of the main advantages and disadvantages of each type of modulation

**FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE**

**SPECIFICATIONS OF THE EXPECTED
BEHAVIOUR**

D. Calculate certain factors specific to radio communications.

**SPECIFIC PERFORMANCE CRI-
TERIA**

- Accurate calculation of factors related to:
 - velocity of wave propagation
 - antennas
 - transmission lines
 - oscillation frequency
 - modulation percentage

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to draw a block diagram of a radio communications system (A):

1. Define the main terms used in radio communications.
2. List the three elements required for radio communication.
3. Use the tables of characteristics of amplitude modulation and frequency modulation radio stations.
4. List the main characteristics of wave propagation.

Before learning how to analyze the block diagrams of the two main types of transmitters: AM and FM (multiplex) (B):

5. Describe the precision of the main types of oscillators.
6. Name the two main types of modulation.
7. List the main types of amplitude modulation circuits.
8. Describe the operation of the main amplitude modulation circuits.
9. List the main types of frequency modulation circuits.
10. Describe the operation of the main frequency modulation circuits.
11. Be familiar with the role and operation of a preemphasis cell in a transmitter.

Before learning how to establish a comparative table of AM and FM systems (C):

12. List the main advantages and disadvantages of amplitude modulation.
13. List the main advantages and disadvantages of frequency modulation.
14. Determine how the amplitude and frequency of an audio signal affect the characteristics of AM and FM waves.

Before learning how to calculate certain factors specific to radio communications (D):

15. List the main characteristics of antennas.
16. List the main characteristics of transmission lines.
17. Measure the main parameters of an amplitude modulation system.
18. Measure the main parameters of a frequency modulation system.
19. Interpret Bessel's table of coefficients.

MODULE 19: ANALYZING AM AND FM (MULTIPLEX) RADIOS

SIMCA: EDT-282
SESAME: 789-364

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **analyze radio circuits** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using the plan of the radio or the diagram of each of its circuits
- Using an AM-FM (multiplex) radio receiver
- Analyzing an amplitude modulation radio and a frequency modulation radio

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions
- Proper analytical procedure
- Use of appropriate terminology

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|---|---|
| A. Interpret the service manuals. | - Accurate interpretation of the technical characteristics of the radio |
| B. Gather information on the main electronic components from the data sheets. | - Relevant use of information contained in the data sheets |
| C. Interpret the block and schematic diagrams of the radio. | <ul style="list-style-type: none"> - Accurate identification of each section of the radio - Accurate identification of the role of each connection between stages - Accurate plotting of signal path |
| D. Inject the signals required for the optimal operation of one or more stages. | <ul style="list-style-type: none"> - Injected signals perfectly adapted to the circuit - Accurate location of injection sites |
| E. Note the signals at the input and output of each stage. | <ul style="list-style-type: none"> - Relevant interpretation of signals: <ul style="list-style-type: none"> • role of signals • amplitude • frequency • components - Satisfactory selection of instruments |

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the service manuals (A):

1. List the main technical characteristics of AM and FM (multiplex) radios.
2. Be familiar with the standardized values of technical specifications.

Before learning how to gather information on the main electronic components from the data sheets (B):

3. Be familiar with the typical bandwidths of the stages.
4. Be familiar with the function of the main active components (diodes, transistors, integrated circuits).

Before learning how to interpret the block and schematic diagrams of the radio (C):

5. Describe the function of each section of an AM receiver.
6. Describe the function of each section of an FM (multiplex) receiver.
7. Define the role of the main components of an AM receiver.
8. Define the role of the main components of an FM (multiplex) receiver.
9. Name the main applications of resonant circuits.
10. List the main characteristics of resonant series circuits.
11. List the main characteristics of resonant parallel circuits.
12. Establish the type and function of the resonant circuits in various radio circuits.
13. Describe the operation of an RF amplifier.
14. Describe the operation of an RF oscillator.
15. Describe the operation of an RF mixer.
16. Describe the heterodyne principle.
17. Describe the operation of an IF stage.
18. Explain the operation of the various demodulation circuits and related circuits.
19. Explain the operation of the automatic gain control in a receiver.
20. Determine which specifications are influenced by each of the various stages of a receiver.
21. Explain the operation of stereo decoders.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to inject the signals required for the optimal operation of one or more stages (D):

- 22. Identify the main signal generators used to analyze receivers.
- 23. Locate the signal injection sites on plans of the equipment.
- 24. Be familiar with the precautions to take in order to avoid overcharging the circuits.
- 25. Read the plans to determine the static levels and signal waveforms at various points in the circuits.

Before learning how to note the signals at the input and output of each stage (E):

- 26. Identify the parameters to be measured.
- 27. Select the appropriate instruments and accessories.

MODULE 20: REPAIRING RADIOS

SIMCA: EDT-283
SESAME: 789-374

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using the service manual
- Working on a problem simulated by the instructor
- Using the appropriate tools and instruments
- Using replacement components
- Repairing an AM-FM (multiplex) radio

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Use of proper techniques for disassembling and reassembling the radio
- Proper sequence of operations
- Mastery of techniques
- Appropriate use of material and equipment
- Clean, precise work
- Observance of the *Consumer Protection Act*

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

A. Evaluate the working condition of the radio.

- Relevant and complete information gathered
- Complete list of problems observed
- Complete list of possible causes of problem

B. Examine the radio and consult reference material.

- Accurate interpretation of the logic diagram
- Accurate testing of components by sight, smell and touch
- Complete list of potential differences required
- Relevant injection and tracing of signals
- Injection of relevant FM signals:
 - FM mono modulated signal
 - FM stereo modulated signal
 - components of multiplex signal
 - AFC signal

C. Diagnose the problem.

- Relevant interpretation of measurements made:
 - power
 - polarity
 - AFC and AGC voltage
 - waveforms at input and output of stages
- Logical deduction based on research
- Accurate diagnosis

D. Estimate the cost of repairs and the time required to make them.

- Satisfactory estimate of cost of parts
- Satisfactory estimate of time

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- E. Make the necessary repairs.**
- F. Make the required adjustments.**
- G. Test the radio.**

SPECIFIC PERFORMANCE CRI- TERIA

- Correct choice of repairs
- Satisfactory selection of tools and equipment
- Satisfactory installation of replacement component
- Quality of finished product
- Use of appropriate adjustment procedure
- Accurate adjustments
- Effective operation of controls
- Acceptable operation:
 - sensitivity
 - distortion
 - output power
 - interference rejection
- Absence of problems previously observed

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to evaluate the working condition of the radio (A):

1. Know how to ask the customer questions.
2. List the main symptoms of the various possible problems.

Before learning how to examine the radio and consult reference material (B):

3. Read and interpret diagrams.
4. Relate the components of the radio to the symbols on the diagrams, and vice versa.
5. Identify the function of each pin of a transistor and integrated circuit.
6. Identify each stage of an AM radio.
7. Identify each control of an AM radio.
8. Identify each indicator of an AM radio.
9. Identify each stage of a stereo FM radio.
10. Identify each control of a stereo FM radio.
11. Identify each indicator of a stereo FM radio.

Before learning how to diagnose the problem (C):

12. Be familiar with the external factors that may influence the operation of a radio.
13. Identify the effects of the poor operation of a stage on the other stages.

Before learning how to estimate the cost of repairs and the time required to make them (D):

14. Price the parts.
15. Be familiar with the company's policies on prices, guarantees and after-sales service.
16. List the factors that influence the amount of time needed to repair a piece of equipment.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to make the necessary repairs (E):

17. Identify the defective components.
18. Identify the precautions to take against static electricity.
19. Select replacement components.

Before learning how to make the required adjustments (F):

20. List the main alignment and adjustment tools.
21. Follow the adjustment procedure recommended by the manufacturer.
22. Identify the parts to be adjusted, based on the plan.
23. Determine the necessary adjustments.

Before learning how to test the radio (G):

24. Identify the characteristics affected by the repair.
25. Be familiar with the rules governing the connection of instruments to the sector.
26. Be familiar with the rules governing the interconnection of radios or instruments.
27. Identify the test material.

MODULE 21: REPAIRING TELEPHONES

SIMCA: EDT-284
SESAME: 789-382

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions and using circuit diagrams
- Working on an electronic telephone
- Using replacement components
- Using the appropriate tools and instruments

GENERAL PERFORMANCE CRITERIA

- Conformity with instructions and observance of time limit
- Clean, precise work
- Observance of *Consumer Protection Act*
- Appropriate use of instruments

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

A. Evaluate the working condition of the telephone.

B. Examine the telephone and consult reference material.

C. Diagnose the problem.

D. Make the repairs.

E. Test the telephone.

SPECIFIC PERFORMANCE CRI- TERIA

- Relevant and complete information gathered
- Complete list of problems observed
- Complete list of possible causes of problem
- Satisfactory testing of mechanical and electronic components
- Accurate interpretation of logic diagram
- Satisfactory selection and use of tools and instruments
- Relevant interpretation of measurements made:
 - polarity
 - waveforms
- Use of proper test procedures
- Logical deduction based on research
- Accurate diagnosis
- Correct choice of repairs
- Satisfactory selection of equipment needed to make repairs
- Quality of finished product
- Absence of problems previously observed
- Acceptable overall operation

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to evaluate the working condition of the telephone (A):

1. Identify the various links in a telephone network.
2. Describe the characteristics of a telephone line.
3. Describe the operation of a conventional telephone.
4. Describe the operation of an electronic telephone.
5. Explain the operating principle of a cordless telephone.
6. Define the functions of a cordless telephone analyzer.

Before learning how to examine the telephone and consult reference material (B):

7. Describe the tests specific to telephones.

Before learning how to diagnose the problem (C):

8. Interpret the results of the examination and research.

Before learning how to make the repairs (D):

9. Select the replacement component.

MODULE 22: REPAIRING MICROWAVE OVENS

SIMCA: EDT-285
SESAME: 789-392

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Repairing a defective microwave oven
- Following instructions and using circuit diagrams
- Using the service manual
- Using replacement components
- Using the appropriate tools and instruments

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Observance of *Consumer Protection Act*
- Proper sequence of operations
- Conformity with instructions and observance of time limit
- Clean work
- Adequate use of instruments and tools
- Expected result: operational and safe oven

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|---|--|
| A. Interpret the service and user's manuals for a microwave oven. | <ul style="list-style-type: none"> - Relevant interpretation of: <ul style="list-style-type: none"> • the characteristics of the oven • safety measures • safety features • technical specifications - Relevant interpretation of normal operation of the oven - Interpretation of symbols and conventions |
| B. Evaluate the condition of the oven. | <ul style="list-style-type: none"> - Complete and detailed information gathered to facilitate research and diagnosis - Complete list of problems observed - Complete list of possible causes of problem |
| C. Examine the oven and consult reference material. | <ul style="list-style-type: none"> - Accurate interpretation of the function of: <ul style="list-style-type: none"> • controls • indicators • adjustments - Relevant interpretation of electrical diagram - Accurate interpretation of logic diagram |
| D. Diagnose the problem. | <ul style="list-style-type: none"> - Accurate interpretation of symptoms and readings - Accurate diagnosis |
| E. Estimate the cost of repairs and the time required to make them. | <ul style="list-style-type: none"> - Accurate selection of replacement parts - Satisfactory estimate of cost of parts - Accurate estimate of time - Satisfactory written evaluation |

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

F. Make the repairs.

G. Test the oven.

SPECIFIC PERFORMANCE CRI- TERIA

- Correct choice of repairs
- Use of appropriate sequence for assembling and disassembling various components
- Accurate positioning of parts

- Normal operation of safety devices
- Observance of radiation emission standards
- Oven completely operational
- Absence of problems previously observed

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the service and user's manuals for a microwave oven (A):

1. Explain the principle of microwave cooking.
2. Identify the safety rules regarding the repair of microwave ovens.
3. Differentiate between programmable power and regressive power.
4. Differentiate between a microwave oven and a convection oven.
5. Identify the safety features of the oven.
6. Identify the symbols and conventions related to microwave ovens.
7. Differentiate between an oven with a turntable and an oven with a rotary radiant element.

Before learning how to evaluate the condition of the oven (B):

8. Ask the client relevant questions.
9. Inspect the mechanical aspect of the oven.
10. Recognize abnormalities.

Before learning how to examine the oven and consult reference material (C):

11. Identify the main parts of a microwave oven.
12. Explain the operation of the power circuit.
13. Explain the operation of the magnetron.
14. Explain the operation of the control module.
15. Inspect the electronic aspect of the oven.

Before learning how to diagnose the problem (D):

16. Interpret the measurements made.
17. Analyze and synthesize the readings.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to estimate the cost of repairs and the time required to make them (E):

18. Select replacement components.
19. Describe all the factors to be taken into account when estimating the time required to make the repairs.
20. State the main regulations of the *Consumer Protection Act* concerning invoices for repairs.

Before learning how to make the repairs (F):

21. Assemble and disassemble the oven.
22. Follow the manufacturer's recommendations with regard to the discharge or neutralization of high-tension or high-intensity parts.

Before learning how to test the oven (G):

23. Test the general mechanical operation of the oven.
24. Measure the power of the oven.
25. Observe the standards regarding microwave leaks.
26. Use a microwave leak detector.

MODULE 23: PRINCIPLES OF MONOCHROME TELEVISION

SIMCA: EDT-286
SESAME: 789-405

Duration: 75 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **apply principles of monochrome television** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using a monochrome television receiver in working order
- Using a question sheet and tables to be completed
- Using a service manual for a monochrome television receiver
- Using the appropriate instruments

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Accurate definitions of aspects of monochrome television broadcasting
- Accurate knowledge of standards used in monochrome television
- Accurate detection of waveforms of a monochrome television receiver

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|--|--|
| A. Draw a simplified block diagram of a monochrome television broadcasting system. | - All essential elements included |
| B. Draw a simplified block diagram of a monochrome television transmitter. | <ul style="list-style-type: none"> - Main blocks included - Accurate identification of blocks representing pictures and sound |
| C. Draw a simplified block diagram of a monochrome television camera. | <ul style="list-style-type: none"> - Accurate identification of the parts of the camera - Main blocks included - Accurate identification of each block |
| D. Draw a block diagram of a monochrome television receiver. | <ul style="list-style-type: none"> - Identification of the main parts of a monochrome television receiver - Accurate identification of blocks - Accurate identification of connections between the blocks |
| E. Analyze the structure of a monochrome picture tube. | <ul style="list-style-type: none"> - Accurate identification of the main parts and components of a monochrome picture tube - Accurate definition of the role of the main components of a monochrome picture tube |

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to draw a simplified block diagram of a monochrome television broadcasting system (A):

1. Define the type of modulation used to broadcast video signals.
2. Define the type of modulation used to broadcast audio signals.

Before learning how to draw a simplified block diagram of a monochrome television transmitter (B):

3. Differentiate between a television transmitter and a radio transmitter.
4. Identify NTSC standards.
5. Define the role of each part of the EIA test pattern.

Before learning how to draw a simplified block diagram of a monochrome television camera (C):

6. Describe the role of the camera in a broadcast network.
7. Define the main terms related to pictures.
8. Describe the operation of a typical monochrome television camera tube.
9. Give a brief description of the main types of television camera tubes.
10. Define the role of the electronic viewfinder on a camera.

Before learning how to draw a block diagram of a monochrome television receiver (D):

11. Identify the main sections of a monochrome television receiver.
12. List the main processing stages, including the antenna, the speaker and the picture tube.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to analyze the structure of a monochrome picture tube (E):

13. Identify the various parts and the main components of a monochrome picture tube.
14. Explain the operating principle of a monochrome picture tube.
15. Differentiate between electrostatic deflection and electromagnetic deflection.
16. Differentiate among the various types of phosphors and their characteristics.

MODULE 24: TUNING CIRCUITS

SIMCA: EDT-287
SESAME: 789-412

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using the plan of a tuner
- Using the service manual
- Using the appropriate tools and instruments
- Using a monochrome television receiver
- Following the teacher's instructions

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Operating parameters of the television receiver used taken into account
- Conformity with instructions
- Proper analytical procedure

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Draw a block diagram of a monochrome VHF-UHF television tuner.
- B. Interpret the schematic diagram of a mechanical tuner.
- C. Interpret the schematic diagram of a varactor tuner.
- D. Measure and interpret the signals at the main test points of the tuning and IF sections.

SPECIFIC PERFORMANCE CRI- TERIA

- Main blocks included
- Accurate identification of main blocks
- Accurate interpretation of the roles of the active components
- Accurate identification of tuner elements
- Accurate plotting of signal path
- Accurate interpretation of the role of the varactors
- Appropriate selection of measuring instruments
- Complete list of voltages and signals at main test points
- Accurate interpretation of signal shaping in the various stages
- Accurate interpretation of the differences between the signals detected and those indicated in the schematic diagram

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to draw a block diagram of a monochrome VHF-UHF television tuner (A):

1. Name the main circuits of a VHF tuner.

Before learning how to interpret the schematic diagram of a mechanical tuner (B):

2. Describe the role of the main components of a tuner input circuit.
3. Locate on the plan and in the tuner the components associated with the RF amplifier and the oscillator.
4. Describe the operation of the channel selector.
5. Name the main circuits of a UHF tuner.
6. Identify the main signals at the input and output of VHF and UHF tuners.
7. Define the role of the VHF tuner in UHF reception mode.
8. Describe the role of the RF amplifier in a television tuner.
9. Define the bandwidth of the RF amplifiers in a television tuner.
10. Explain the operation of the IF section of a television receiver.
11. Describe the operation of manual fine tuning.

Before learning how to interpret the schematic diagram of a varactor tuner (C):

12. Describe the operation of a variable-capacitance diode oscillator.

Before learning how to measure and interpret the signals at the main test points of the tuning and IF sections (D):

13. Explain how the AGC signal controls RF amplifier gain.

MODULE 25: VIDEO CIRCUITS

SIMCA: EDT-288
SESAME: 789-422

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using service manuals
- Using the appropriate instruments
- Using a monochrome television receiver in working order
- Following the teacher's instructions

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Appropriate use of tools and measuring instruments
- Conformity with operating parameters of the television receiver
- Conformity with instructions
- Proper analytical procedure

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Draw a block diagram of the video section of a monochrome television receiver.**
- B. Interpret the schematic diagram of the video section of a monochrome television.**
- C. Plot the trajectory of the signals on the schematic diagram.**
- D. Measure and interpret the various parameters of the video signal.**

SPECIFIC PERFORMANCE CRI- TERIA

- Main blocks included
- Accurate identification of each block
- Accurate interconnection of blocks
- Accurate interpretation of the role of each circuit in the video section
- Accurate plotting of the path of the video signal and control signals
- Relevant choice of measuring instruments
- Satisfactory precision of measurements made
- Accurate interpretation of parameters measured

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to draw a block diagram of the video section of a monochrome television receiver (A):

1. Identify all the components of the signal at the output of the last video IF amplifier.
2. Define the processing that a signal must undergo at the output of the last IF amplifier in order to produce a picture and sound of normal quality.

Before learning how to interpret the schematic diagram of the video section of a monochrome television (B):

3. Describe the operation of a typical video detector.
4. Describe the IRE scale and the related standards.
5. Explain the operation of the contrast control circuit.
6. Explain the operation of the brilliance control circuit.
7. Explain the operation of video amplifiers.

Before learning how to measure and interpret the various parameters of the video signal (D):

8. Select and use the appropriate measuring instruments.
9. Identify the various test points in the television receiver.

MODULE 26: DEFLECTION, SYNCHRONIZATION AND HIGH VOLTAGE

SIMCA: EDT-289
SESAME: 789-432

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using the plan of a monochrome receiver
- Following the teacher's instructions
- Using service manuals
- Using a monochrome receiver in working order

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions
- Proper analytical procedure
- Appropriate use of tools and measuring instruments
- Operational parameters of receiver taken into account

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Interpret the block diagram of the deflection section of a monochrome television receiver.
- B. Interpret the diagram of the horizontal and vertical deflection and high-voltage sections.
- C. Measure and interpret the various parameters of horizontal deflection, vertical deflection and high-voltage circuits.

SPECIFIC PERFORMANCE CRI- TERIA

- Accurate interpretation of the role of each block of the vertical deflection, horizontal deflection and high-voltage sections
- Accurate interpretation of the connections between the blocks
- Circuit in conformity with diagram
- Accurate interpretation of the symbols representing deflection circuit parts
- Accurate interpretation of the role of the main parts
- Relevant choice of measuring instruments
- Satisfactory use of instruments
- Accurate measurements of polarity and waveforms
- Accurate interpretation of signal frequency and waveforms
- Accurate interpretation of the role of the various deflection and high-voltage controls

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the block diagram of the deflection section of a monochrome television receiver (A):

1. Define the role and the characteristics of synchronizing signals.
2. Define the role and the characteristics of a sawtooth signal.
3. Describe the technique of interlacing in order to obtain a test chart.
4. Describe the main distortions of a scanning field.
5. Describe the effects of non-linear scanning.

Before learning how to interpret the diagram of the horizontal and vertical deflection and high-voltage sections (B):

6. Locate the components on the printed circuits.
7. Define the function of the main synchronization stages and explain their operation.
8. Define the function of the main vertical scanning stages and explain their operation.
9. Define the function of the main horizontal scanning stages and explain their operation.
10. Define the function of the main vertical deflection circuit controls.
11. Identify the characteristics of deflection coils.
12. List the characteristics of the operation of the two power sections of a television.

Before learning how to measure and interpret the various parameters of horizontal deflection, vertical deflection and high-voltage circuits (C):

13. Identify on the diagram the inputs and outputs of the various stages.
14. Interpret the legends on the different plans.
15. Describe the role of the various controls.
16. Locate the controls relevant to the operation of deflection and high-voltage circuits.
17. Select and use the appropriate instruments.
18. Measure the various waveforms.

MODULE 27: REPAIRING MONOCHROME MONITORS

SIMCA: EEB-281
SESAME: 789-453

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using a defective monochrome monitor
- Following instructions
- Using the service manual
- Using replacement components
- Using the appropriate tools and instruments

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions
- Proper sequence of operations
- Appropriate use of tools and instruments
- Clean, precise work
- Observance of the *Consumer Protection Act*

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Evaluate the working condition of the monitor.
- B. Examine the monitor and consult reference material.
- C. Diagnose the problem.
- D. Make the necessary repairs.

SPECIFIC PERFORMANCE CRI- TERIA

- Relevant and complete information gathered
- Complete list of problems observed
- Complete list of possible causes of problem
- Satisfactory testing of components by sight, smell and touch
- Satisfactory selection and use of tools and instruments
- Accurate location of test points
- Relevant interpretation of measurements made:
 - potential difference
 - waveforms
- Relevant interpretation of information contained in the service manual
- Accurate diagnosis
- Accurate interpretation of problems observed and references consulted
- Correct choice of repairs
- Accurate positioning and installation of parts
- Quality of finished product

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE	
SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRI- TERIA
E. Make the required adjustments.	- Proper procedure for making adjustments after realignment and after a change of CRT - Proper procedure for making adjustments after changing critical parts
F. Test the monitor.	- Absence of problems previously observed - Acceptable overall operation

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to evaluate the working condition of the monitor (A):

1. Evaluate the mechanical condition of the monitor.
2. Differentiate between a television receiver and a monitor.
3. Describe the role of each control, each selector and each terminal, and determine their interaction, if applicable.
4. Test the response of the main external controls.
5. Identify the function of the input terminals and test them.
6. Identify the problems specific to video amplifiers, the DC component restoration circuit and the picture tube.
7. Identify the symptoms specific to synchronizing circuits.
8. Identify the symptoms specific to vertical scanning systems.
9. Identify the symptoms specific to the horizontal oscillator and the AFC circuit.
10. Identify the symptoms specific to the horizontal scanning output circuits and the high-voltage circuit.

Before learning how to examine the monitor and consult reference material (B):

11. Identify the various sections of a monochrome monitor.
12. Name and describe the role of the main instruments used to repair monitors.
13. List the characteristics of the operation of the video section of a monochrome monitor.
14. Interpret the logic diagram in the service manual.
15. Measure the various waveforms and various DC voltages.
16. Test the monitor.

Before learning how to diagnose the problem (C):

17. Determine the causes of various possible problems.
18. Interpret the results of the examination and research.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to make the necessary repairs (D):

- 19. Make proper use of the electronic and mechanical parts list for the monitor.
- 20. Correct the loose connections that may cause interruptions in the circuit.
- 21. Replace a deflection coil to correct the monitor's defects.

Before learning how to make the required adjustments (E):

- 22. Adjust the various monitor controls.
- 23. Define the purpose of the main adjustments.
- 24. Follow the adjustment procedure used after replacing the picture tube.
- 25. Follow the procedure for adjusting the various circuits.

Before learning how to test the monitor (F):

- 26. Define and perform the safety tests required after a repair.

MODULE 28: REPAIRING MONOCHROME TELEVISION RECEIVERS

SIMCA: EEB-282
SESAME: 789-443

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using a defective monochrome television receiver
- Using the RF and IF sections of a monochrome television receiver
- Following instructions
- Using the service manual
- Using replacement components
- Using the appropriate tools and instruments

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions
- Proper sequence of operations
- Appropriate use of tools and instruments
- Clean, precise work
- Observance of the *Consumer Protection Act*

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

SPECIFIC PERFORMANCE CRI- TERIA

- | | |
|--|---|
| A. Evaluate the working condition of the television receiver. | <ul style="list-style-type: none"> - Relevant and complete information gathered - Complete list of problems observed - Complete list of possible causes of problem |
| B. Examine the television receiver and consult reference material. | <ul style="list-style-type: none"> - Satisfactory testing of components by sight, smell and touch - Satisfactory selection and use of tools and instruments - Accurate location of test points - Relevant interpretation of measurements made: <ul style="list-style-type: none"> • potential difference • waveforms |
| C. Diagnose the problem. | <ul style="list-style-type: none"> - Accurate diagnosis - Accurate interpretation of problems observed and references consulted |
| D. Make the necessary repairs. | <ul style="list-style-type: none"> - Correct choice of repairs - Accurate positioning and installation of parts - Quality of finished product |
| E. Make the required adjustments and alignments. | <ul style="list-style-type: none"> - Use of proper adjustment and alignment procedures |
| F. Test the television receiver. | <ul style="list-style-type: none"> - Absence of previously observed problems - Acceptable overall operation |

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to evaluate the working condition of the television receiver (A):

1. Inspect the mechanical parts of the television.
2. Test the various external controls.
3. Interpret the data sheet of the receiver's characteristics.
4. Describe how the quality of the picture and the sound is affected by a receiving signal that is too powerful or too weak.
5. Identify the symptoms specific to the synchronizing circuit.
6. Identify the symptoms specific to the IF video circuit.
7. Identify the symptoms specific to the AGC systems.
8. Identify the symptoms specific to the audio circuits of a television receiver.
9. Identify the symptoms specific to the low-voltage power source.

Before learning how to examine the television receiver and consult reference material (B):

10. Apply principles of monochrome television.
11. Name and describe the role of the main instruments used to test the IF picture and sound circuit tuner, the picture and sound detector circuits and the audio amplifier stages.
12. Describe the insulating transformer and explain its usefulness.
13. Identify each of the internal parts of the television receiver.
14. Find the symptoms of a defect in a monochrome television receiver.
15. Read and interpret plans of the television receiver in the service manual.
16. Interpret the logic diagram in the service manual.
17. Describe the various methods of repairing RF and IF circuits.
18. Locate on the printed circuit diagrams the various voltage and waveform test points.

Before learning how to diagnose the problem (C):

19. Identify the external factors that can influence the operation of monochrome television receivers.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to make the necessary repairs (D):

- 20. Tighten the loose connections that may cause interruptions in the circuit.
- 21. Adjust the selector of a television receiver.

Before learning how to make the required adjustments and alignments (E):

- 22. Adjust the various controls of the television receiver.
- 23. Be familiar with the main possible adjustments.

Before learning how to test the television receiver (F):

- 24. Define and perform the safety tests required after a repair.
- 25. Consult the user's manual for the television receiver.

MODULE 29: INSTALLING AUDIO-VISUAL EQUIPMENT

SIMCA: EEB-283
SESAME: 789-464

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **install audio-visual receivers** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using installed radio and television receiving equipment including:
 - C and Ku band parabolic antenna
 - tower (no higher than 7 meters)
 - rotor
 - VHF-UHF antennas
 - related material
- Using the material necessary to create an RF signal distribution system within the school
- Using a modular audio-visual system
- Using reference material
- Using the appropriate tools, instruments and equipment
- Using the necessary material

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety standards
- Conformity with instructions
- Clean work
- Appropriate use of tools, instruments and equipment
- Observance of the *Consumer Protection Act*

**FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE**

**SPECIFICATIONS OF THE EXPECTED
BEHAVIOUR**

**SPECIFIC PERFORMANCE CRI-
TERIA**

A. Plan the installation.

- Installation plan in conformity with instructions
- Satisfactory selection of material
- Proper sequence of operations

B. Estimate the cost.

- Satisfactory estimate

C. Install the equipment.

- Observance of safety measures
- Installation in conformity with installation plan and specifications
- Solid installation
- Solid connections

D. Test the equipment.

- Installation in conformity with plan and specifications
- System completely operational
- Cables properly positioned

E. Issue an invoice.

- Presence of all relevant information
- Accurate calculations

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to plan the installation (A):

1. Describe each element of an RF signal reception system.
2. Consult reference material.
3. Evaluate the quality of the signals in the immediate environment.
4. Observe public service standards and rules.
5. Select the necessary material.
6. Describe the main methods of RF coupling and separating.
7. Describe the principle of satellite signal reception.

Before learning how to estimate the cost (B):

8. Apply the regulations of the *Consumer Protection Act*.
9. Apply the employer's pricing policy.

Before learning how to install the equipment (C):

10. Use measuring instruments correctly.
11. Make the connections.
12. Describe the adjustments required.
13. Identify the potential dangers.

Before learning how to test the equipment (D):

14. Identify the safety devices.

MODULE 30: PRINCIPLES OF COLOUR TELEVISION

SIMCA: EEB-284
SESAME: 789-474

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **apply principles of colour television** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using the service manual
- Using a recent colour television without digital image processing
- Using the appropriate instruments

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions
- Proper analytical procedure
- Appropriate use of measuring instruments

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Interpret the block diagram of a colour television transmitter with MTS signals.

- B. Analyze the structure of the main three-colour picture tubes.

- C. Interpret the block diagram of a colour television receiver with a phase-locked loop and MTS system.

- D. Interpret the schematic diagram of a colour television receiver with a phase-locked loop (PLL).

SPECIFIC PERFORMANCE CRI- TERIA

- Accurate interpretation of the role of each block:
 - luminance section
 - chrominance section
 - audio section
- Accurate interpretation of the role of the connections between the blocks
- Accurate interpretation of signals

- Accurate interpretation of the main components of a three-colour picture tube
- Accurate definition of the role of the main components of a three-colour picture tube

- Accurate identification of each block:
 - audio section
 - video section
- Accurate definition of role of each block:
 - audio section
 - video section
- Accurate interpretation of the role of the connections between the blocks

- Accurate interpretation of the path of the main signals
- Accurate interpretation of the main waveforms
- Accurate interpretation of the role of the analog control signals

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the block diagram of a colour television transmitter with MTS signals (A):

1. Justify the need for compatibility between monochrome and colour broadcasting.
2. Define the terminology specific to colour television.
3. Give a brief description of the role of the colour camera.
4. Describe the operation of a matrix circuit of an NTSC colour transmitter or encoder.
5. Justify the standard of 3.579545 MHz as the frequency value of the colour subcarrier.
6. Describe the operating principle of I and Q modulators.
7. Describe the operating principle of a symmetrical modulator.
8. Interpret the graph of the phantom overlay within a 6 MHz channel.
9. Situate and define the vertical blanking interval test signal and the special signals.
10. Define the terms specific to audio signals in colour television.
11. Interpret the MTS system spectrum.
12. Compare radio stereo with television stereo.
13. Define the role of the 15.734 KHz pilot carrier.
14. Define the characteristics of the SAP signal.
15. Establish a parallel between the professional sub-channel signal (FM or FSK) in television broadcasting and the SCA signal in radio broadcasting.
16. Identify the blocks of the simplified block diagram of an MTS transmission system.
17. Identify the blocks of the simplified block diagram of a stereo generator for a television transmitter.
18. Identify the blocks of the simplified block diagram of an SAP generator for a television transmitter.

Before learning how to analyze the structure of the main three-colour picture tubes (B):

19. Identify the various three-colour picture tubes.
20. Identify the internal and external elements of a three-colour picture tube that are different from monochrome tubes.
21. Describe the role of various external elements of a three-colour picture tube that allow the picture of a colour television receiver to be adjusted.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the block diagram of a colour television receiver with a phase-locked loop and MTS system (C):

22. Interpret the data sheet for a colour television receiver.
23. Describe the operation of a phase-locked loop (PLL) system as a colour television control system.

Before learning how to interpret the schematic diagram of a colour television receiver with a phase-locked loop (PLL) (D):

24. Describe the operation of the RF selector module.
25. Describe the operation of the audio/video selector.
26. Describe the operation of the low-voltage power source.
27. Describe the operation of the television control panel.
28. Describe the operation of an infrared (IR) remote-control system.
29. Describe the operating principle of a surface wave acoustic filter.
30. Describe the operation of an MTS audio circuit.
31. Describe the operation of deflection circuits.
32. Describe the operation of the video output circuit.

MODULE 31: CHROMINANCE AND LUMINANCE CIRCUITS

SIMCA: EEB-285
SESAME: 789-483

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **analyze the chrominance and luminance circuits of a television receiver** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using the plans and data sheets for chrominance and luminance ICs
- Using diagrams of the colour section of a recent television receiver with analog image processing
- Following instructions for circuit analysis
- Using service manuals
- Using television receivers in working order

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with instructions regarding analysis
- Proper analytical procedure
- Characteristics of the television receiver taken into account
- Appropriate use of measuring instruments

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Interpret the block diagram of the luminance (Y) section of a colour receiver.
- B. Interpret the block diagram of the chrominance (C) section of a colour receiver.
- C. Measure and interpret chrominance and luminance signals at the main test points.

SPECIFIC PERFORMANCE CRI- TERIA

- Accurate identification of each block
- Accurate interpretation of operation of the main circuits and controls
- Accurate identification of each block
- Accurate interpretation of operation of the main circuits and controls
- Complete list of relevant signals
- Accurate interpretation of signals measured

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the block diagram of the luminance (Y) section of a colour receiver (A):

1. Identify the various waveforms of the luminance stages.
2. Explain the operation of the various types of signal delay lines.

Before learning how to interpret the block diagram of the chrominance (C) section of a colour receiver (B):

3. Give a brief description of the function of the chrominance section.
4. Explain why the colour receiver has a separated detection stage at 4.5 MHz.
5. Describe the operation of a typical phase comparer.
6. Explain the operating principle of a typical synchronous detector.
7. Explain colour information processing, using the block diagram of a typical integrated circuit.
8. Describe the role of a comb filter.
9. Explain the operation of a comb filter.
10. Compare the advantages and disadvantages of an I-Q receiver with those of a (B-Y) and (R-Y) receiver.
11. Explain the operation of the colour kinescope recorder.

Before learning how to measure and interpret chrominance and luminance signals at the main test points (C):

12. List the characteristics of the main chrominance and luminance signals.
13. State the function of each stage in the chroma section of a colour receiver.
14. Identify the various waveforms of the chrominance stages.
15. Interpret the oscillogram of the coded video signal taken at the output of the video detector.
16. Define "level of luminance" based on the oscillogram of the coded video signal.

MODULE 32: DIGITAL VIDEO PROCESSING

SIMCA: EEB-286
SESAME: 789-493

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **analyze an information processing and character generating circuit** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using a colour television receiver with digital image processing
- Using the service manual
- Using the appropriate instruments
- Using plans and data sheets for the main processors

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Conformity with teacher's instructions
- Proper analytical procedure
- Characteristics of the television receiver taken into account
- Appropriate use of measuring instruments

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Interpret the block diagram of a digital colour receiver.

- B. Interpret the block diagram of the main processors and special modules of a digital television receiver.

- C. Measure the signals of the digital processing module.

SPECIFIC PERFORMANCE CRI- TERIA

- Accurate identification of each of the blocks for digital or analog processing
- Accurate interpretation of the role of the connections between:
 - each digital processing block
 - digital processing blocks and analog processing blocks

- Accurate identification of each block of the main processors and the special effects modules
- Accurate identification of the role of each processor
- Establishment of an accurate parallel between the analog and digital blocks within the processors

- Appropriate selection and use of measuring instruments
- Accurate identification of the characteristics of the input and output signals of each processor and special module

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to interpret the block diagram of a digital colour receiver (A):

1. Define the main terms specific to digital colour television receivers and monitors.
2. Establish a parallel between analog television and digital television.
3. Define the advantages of digital technology in colour television receivers and monitors.

Before learning how to interpret the block diagram of the main processors and special modules of a digital television receiver (B):

4. Define the functions of the central control unit (CCU).
5. Describe the operation of a microprocessing tuner.
6. Describe the operation of a typical digital channel display circuit.
7. Describe the function of the "Colour Sentry" circuit.
8. Describe the operation of the channel programming system of a colour television receiver.
9. Define the functions of the master clock unit (MCU).
10. Define the functions of the video-coding unit (VCU).
11. Identify the characteristics of ASCII characters.
12. Describe the operating principle of ROM acting as a character generator.
13. Describe the operating principle of a character generator for a cathode ray tube.
14. Define the functions of the teletext processing unit (TPU).
15. Define the functions of the comb video processing unit (CVPU).
16. Define the functions of the audio-digital converter (ADC).
17. Define the functions of the audio processing unit (APU).
18. Define the functions of the deflection processing unit (DPU).
19. Explain the operating principle of the picture-in-picture system (PIP).
20. Define the functions of each circuit in the picture-in-picture module.
21. List the characteristics of the signals delivered by the picture-in-picture module.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to measure the signals of the digital processing module (C):

- 22. Select the instruments for digital signal analysis.**
- 23. Locate the input and output points for the various signals for each processor.**
- 24. Activate the processors in order to observe their operation.**

MODULE 33: INTEGRATION INTO THE WORKPLACE

SIMCA: EEB-287
SESAME: 789-504

Duration: 60 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 **integrate into the labour market.**

SPECIFICATIONS

At the end of this module, the students will:

- Be familiar with the work environment.
- Have a more accurate perception of the work context, professional practices, and their aptitudes, preferences and interests.
- Be prepared to function in a work environment.

LEARNING CONTEXT

PHASE 1: Preparing for the Practicum

- Becoming aware of the information and procedures related to the practicum.
- Setting criteria for choosing an employer.
- Making a list of companies likely to hire students for a practicum.
- Applying for a practicum position.

FIRST-LEVEL OPERATIONAL OBJECTIVE SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 2: Observing and Carrying Out Activities in the Work Environment

- Observing the work context: socio-economic environment (product, market), trade associations, structure, equipment, technological development, working conditions, interpersonal relationships, health and safety.
- Observing or participating in various work-related tasks.
- Producing a brief report detailing their observations regarding the work context and the tasks performed during the practicum.

PHASE 3: Comparing Initial Perceptions with the Reality of the Work Environment

- Pointing out aspects of the trade that differ from the training.
- Discussing the accuracy of their perception of the work environment and professional practices before and after the practicum.
- Discussing how this experience will affect their choice of career: aptitudes, preferences, interests.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Provide the students with means to help them choose a practicum wisely.
- Make arrangements for cooperation between the establishments and the school.
- Enable the students to observe and perform work-related tasks.
- Ensure that the students are constantly supervised by a responsible worker.
- Ensure that the students receive the services they need.
- Help in case of difficulty or problems.
- Encourage students to discuss their opinions with each other and to express themselves, particularly when they are choosing where to do their practicum and when they are comparing their initial perceptions with their experience.

FIRST-LEVEL OPERATIONAL OBJECTIVE SITUATIONAL OBJECTIVE

PARTICIPATION CRITERIA

PHASE 1:

- List in order of priority three companies that fulfil their predetermined selection criteria.
- Meet a representative of the company and apply for a practicum.

PHASE 2:

- Observe the company's policies regarding work schedules and the activities the student is permitted to perform.
- Write a report containing information on at least five subjects and describe the tasks performed or observed.

PHASE 3:

- Share with their classmates their experience in the work environment, on the basis of their report.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before undertaking the activities of Phase 1:

1. Describe the planning stages for looking for a practicum position.
2. List the attitudes necessary for a creative practicum search.

Before undertaking the activities of Phase 2:

3. Describe the rules to be followed during the practicum.
4. Describe the behaviour to be adopted in the work environment.

Before undertaking the activities of Phase 3:

5. List their aptitudes, preferences and interests with respect to the trade.
6. Describe the requirements of the work environment.

MODULE 34: REPAIRING COLOUR TELEVISION RECEIVERS

SIMCA: EEB-288
SESAME: 789-516

Duration: 90 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

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

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Following instructions
- Using a defective television receiver with digital image processing
- Using the service manual
- Using the appropriate tools and instruments
- Using replacement components

GENERAL PERFORMANCE CRITERIA

- Observance of occupational health and safety rules
- Proper sequence of operations
- Clean, precise work
- Observance of the *Consumer Protection Act*
- Appropriate use of material and instruments
- Mastery of techniques

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Evaluate the working condition of the television receiver.
- B. Examine the television receiver and consult reference material.
- C. Diagnose the problem.
- D. Make the necessary repairs.
- E. Make the required adjustments.
- F. Test the television receiver.

SPECIFIC PERFORMANCE CRI- TERIA

- Complete list of problems observed
- Complete list of possible causes of problem
- Accurate interpretation of the logic diagram
- Relevant interpretation of measurements made
- Accurate interpretation of problems observed and references consulted
- Accurate diagnosis
- Correct choice of repairs
- Accurate interpretation of exploded views
- Use of proper procedure for assembling and disassembling the CRT
- Use of proper realignment procedure and procedure for changing the CRT
- Use of proper adjustment procedure after changing critical parts
- Absence of problems previously observed
- Acceptable overall operation

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to evaluate the working condition of the television receiver (A):

1. State the function of the main controls of the television receiver.
2. State the function of the main input and output connections of the television receiver.
3. Use the main instruments used to repair colour television receivers with digital image processing.

Before learning how to examine the television receiver and consult reference material (B):

4. Identify each wafer of the printed circuits.
5. Locate the main printed circuits inside the television receiver.
6. Interpret the diagram of the printed circuit in order to locate components and test points.
7. Locate the identification of the active components' wires.
8. Interpret the block diagram of the television receiver.
9. Compare the waveforms measured with those provided by the manufacturer.
10. Follow the paths of the main signals on the schematic diagram.

Before learning how to diagnose the problem (C):

11. Apply logically the principles of colour television and the results of the chrominance and luminance circuit analysis as well as the digital video processing analysis.

Before learning how to make the necessary repairs (D):

12. State the safety measures to be adopted when working on large colour television receivers.
13. Follow the recommendations in the repair section.
14. Interpret the information on the parts list.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to make the required adjustments (E):

- 15. List the adjustments to be made immediately after replacing the picture tube.
- 16. List the adjustments related to safety.
- 17. List the adjustments of the colour television circuits.

Before learning how to test the television receiver (F):

- 18. Interpret the information in the user's manual.

MODULE 35: HOUSE CALLS

SIMCA: EEB-289
SESAME: 789-522

Duration: 30 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **make house calls** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using the required material and equipment
- With the help of one person playing the role of the customer
- Using the required forms
- Based on a simulation in the school
- Under the teacher's supervision

GENERAL PERFORMANCE CRITERIA

- Conformity with instructions
- Mastery of proper behaviour
- Precise information given
- Acceptable behaviour

FIRST-LEVEL OPERATIONAL OBJECTIVE BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR

- A. Communicate orally with the customer.
- B. Plan the work.
- C. Confirm or reject the preliminary diagnosis.
- D. Make repairs in cramped spaces.
- E. Perform administrative tasks.

SPECIFIC PERFORMANCE CRI- TERIA

- Relevant questions asked of customer
- Quality of telephone communication
- Acceptable preliminary diagnosis
- Correct establishment of work plan
- Correct identification of needs
- Identification of possible internal and external causes
- Respect for the property of others
- Use of methods for ensuring the safety of people and property
- Relevance of information provided:
 - oral information for the client
 - written information for the company

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to communicate orally with the customer (A):

1. Use terminology specific to house calls.
2. State the directions for using various pieces of equipment for which house calls are apt to be made.
3. Determine the environmental conditions at the time of the malfunction.

Before learning how to plan the work (B):

4. Plan a route using a road map.
5. Gather the appropriate material.
6. Evaluate the time needed to perform various tasks.
7. Identify the elements necessary for a successful house call.
8. Name the elements necessary for maintaining a service vehicle.
9. Classify service calls according to priority and location.

Before learning how to confirm or reject the preliminary diagnosis (C):

10. Use a psychological approach that reassures the customer.
11. Inspect the piece of equipment and the environment.

Before learning how to make repairs in cramped spaces (D):

12. Submit an estimate to the client.
13. Observe the *Consumer Protection Act*.
14. Provide information on the various types of guarantees.

Before learning how to perform administrative tasks (E):

15. Apply the policies of the service centre.
16. Select the appropriate forms.
17. Clarify the after-sales service conditions with the client.

MODULE 36: JOB-SEARCH TECHNIQUES

SIMCA: ECI-289
SESAME: 843-121

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 **use job-search techniques.**

SPECIFICATIONS

At the end of this module, the students will:

- Identify potential employers.
- Write a letter of introduction and a résumé.
- Participate in a real or simulated job interview.

LEARNING CONTEXT

PHASE 1: Finding potential employers

- Identifying and using various sources of information.
- Developing a plan of action.
- Identifying employers whose activities correspond to their occupational and personal interests.

FIRST-LEVEL OPERATIONAL OBJECTIVE SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 2: Writing a letter of introduction and a résumé

- Writing a résumé and a letter of introduction.
- Soliciting interviews.
- Observing follow-up procedures.

PHASE 3: Participating in an interview

- Identifying their strengths and weaknesses with respect to a given job.
- Participating in a selection interview.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Help the students consult various sources of information about jobs and employers (e.g. newspapers, employment centres, data banks).
- Ensure that the students develop a plan of action.
- Give examples of organizational tools (e.g. plan of action, agenda) and communication tools (résumé, letter of introduction, telephone etiquette).
- Organize mock selection interviews.
- Encourage the students to share information.

PARTICIPATION CRITERIA

PHASE 1:

- Gather information on various employers.
- Identify the workplaces whose activities correspond to their interests.

FIRST-LEVEL OPERATIONAL OBJECTIVE SITUATIONAL OBJECTIVE

PARTICIPATION CRITERIA

PHASE 2:

- Present their résumés.
- Observe the procedure.
- Observe follow-up procedure.

PHASE 3:

- Discuss their strengths during a job interview.

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before undertaking the activities of Phase 1:

1. Identify the resources and techniques useful for a job search.
2. Show initiative and creativity in their job search.

Before undertaking the activities of Phase 2:

3. Identify the information contained in a letter of introduction and a résumé.
4. Describe the steps involved in soliciting a job interview.
5. Show persistence and creativity in their job search.

Before undertaking the activities of Phase 3:

6. Discuss the importance of preparing for an interview.
7. Simulate an interview.
8. Be tactful and polite.
9. Emphasize their strengths.