7

BUILDINGS AND PUBLIC WORKS

PREPARING AND FINISHING CONCRETE

PROGRAM OF STUDY

5617

VOCATIONAL and TECHNICAL EDUCATION

Québec

BUILDINGS AND PUBLIC WORKS

PREPARING AND FINISHING CONCRETE

PROGRAM OF STUDY
5617

ISBN 2 - 550 - 32859-0

Legal Deposit — Bibliothèque nationale du Québec, 1998

BUILDINGS AND PUBLIC WORKS

PREPARING AND FINISHING CONCRETE

PROGRAM OF STUDY
5617

The *Preparing and Finishing Concrete* program leads to the Secondary School Vocational Diploma (SSVD) and prepares the student to practise the trade of

CEMENT FINISHER

Direction générale de la formation professionnelle et technique

DEVELOPMENT TEAM

Design and Development	André Bellemare **Education Development Officer**
Technical Support	Denise Tremblay **Technical Consultant**
Coordination	Jean-Paul Bergeron **Coordinator of the Construction Sector**
Occupational Health and Safety Revision	**Under the responsibility of** Raymond Mailhot (CSST)
English Version	Services à la communauté anglophone Direction de la production en langue anglaise

ACKNOWLEDGMENTS

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

Representatives from the Sous-comité des cimentiers-applicateurs

Lyan Lavallée
Québec Road Builders and Heavy Construction Association (QRBHCA)

Renaldo Cattelan
Association de la construction du Québec (ACQ)

Tim Argento
Jean-Pierre Cadieux
Association of Building Contractors of Québec (ABCQ)

Christian Thomassin
Trowel Trades Canadian Association - Local 100 (FTQ - Construction)

Yves Bertrand
Association internationale des ouvriers plâtriers, cimentiers-applicateurs et tireurs de joints, Local 129 (CPQMC - INTERNATIONAL)

Jean-Guy Lévesque
Centrale des syndicats démocratiques (CSD) (Congress of Democratic Unions)

Louis Alfaro
Confederation of National Trade Unions (CNTU - Construction)

Representatives from the Commission de la construction du Québec (CCQ)

Pierre Fournier
Claire Grégoire
Yves Dusseault
Fernand Roireau

Representatives from the employment sector

André Blain
Michael Cadussi
Yvon Léger
Alain Marion

TABLE OF CONTENTS

Page

INTRODUCTION 1

GLOSSARY 3

PART I

1. SYNOPTIC TABLE 7

2. PROGRAM TRAINING GOALS 9

3. COMPETENCIES 11

   Grid of Learning Focuses 12

4. GENERAL OBJECTIVES 13

5. FIRST- AND SECOND-LEVEL OPERATIONAL OBJECTIVES 15

   5.1 Definition 15
   5.2 How to Read First-Level Operational Objectives 16

PART II

MODULE 1: THE TRADE AND THE TRAINING PROCESS 21
MODULE 2: NATURE OF MATERIALS AND COMMONLY USED PRODUCTS 25
MODULE 3: APPLYING CONCEPTS RELATED TO CONCRETE 29
MODULE 4: PLACING AND FINISHING CURBS AND SIDEWALKS 35
MODULE 5: READING PLANS AND SPECIFICATIONS 41
MODULE 6: PRODUCING SLABS OF EXPOSED AGGREGATE 45
MODULE 7: BASIC REPAIRS TO SURFACES OF STUCCO, PARGING AND EXPOSED AGGREGATE 49
MODULE 8: SOLVING PROBLEMS OF MATHEMATICS AND MEASUREMENT 55
MODULE 9: PRODUCING STUCCO AND PARGING SURFACES 59
MODULE 10: INSTALLATION OF WEATHERPROOF MEMBRANES 65

MODULE 11: OCCUPATIONAL HEALTH AND SAFETY ON CONSTRUCTION SITES . . 69
MODULE 12: COMMUNICATION IN THE WORKPLACE 73
MODULE 13: INSTALLATION OF CONCRETE FLOORS 77
MODULE 14: ORGANIZATIONS IN THE CONSTRUCTION INDUSTRY 83
MODULE 15: BASIC REPAIRS TO CONCRETE STRUCTURES 87
MODULE 16: FINISHING REGULAR AND COLOURED CONCRETE SURFACES 93
MODULE 17: FINISHING SURFACES WITH EPOXY RESIN 99
MODULE 18: PLACING AND FINISHING CONCRETE STAIRWAYS 103

INTRODUCTION

The *Preparing and Finishing Concrete* 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 diploma 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 900 hours, which includes 660 hours spent on the specific competencies required to practise the trade and 240 hours on general competencies. The program of study is divided into 18 modules, which vary in length from 15 to 120 hours (multiples of 15). The time allocated to the program is to be used not only for teaching but also for evaluation and remedial work. The modules are divided into two 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.

Operational Objectives

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

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.

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.

General Objectives

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

PART I

1. SYNOPTIC TABLE

Number of modules: 18
Duration in hours: 900
Credits: 60

Preparing and Finishing Concrete
CODE: 5617

CODE		TITLE OF THE MODULE	HOURS	CREDITS*
758 681	1.	The Trade and the Training Process	15	1
758 692	2.	Nature of Materials and Commonly Used Products	30	2
758 703	3.	Applying Concepts Related to Concrete	45	3
758 715	4.	Placing and Finishing Curbs and Sidewalks	75	5
758 723	5.	Reading Plans and Specifications	45	3
758 733	6.	Producing Slabs of Exposed Aggregate	45	3
758 742	7.	Basic Repairs to Surfaces of Stucco, Parging and Exposed Aggregate	30	2
758 753	8.	Solving Problems of Mathematics and Measurement	45	3
758 764	9.	Producing Stucco and Parging Surfaces	60	4
758 774	10.	Installation of Weatherproof Membranes	60	4
755 002	11.	Occupational Health and Safety on Construction Sites	30	2
758 782	12.	Communication in the Workplace	30	2
758 798	13.	Installation of Concrete Floors	120	8
755 001	14.	Organizations in the Construction Industry	15	1
758 802	15.	Basic Repairs to Concrete Structures	30	2
758 814	16.	Finishing Regular and Coloured Concrete Surfaces	60	4
758 824	17.	Finishing Surfaces with Epoxy Resin	60	4
758 837	18.	Placing and Finishing Concrete Stairways	105	7

* 15 hours = 1 credit
The two blocks of 450 hours are separated by a dotted line.
This program leads to an SSVD in Preparing and Finishing Concrete

2. PROGRAM TRAINING GOALS

The training goals of the *Preparing and Finishing Concrete* program are based on the general goals of vocational education and take into account the specific nature of the trade. These goals are:

To develop effectiveness in the practice of a trade.

- To teach students to perform activities related to preparing and finishing concrete at an acceptable level of competence for entry into the job market.

- To prepare students to perform satisfactorily on the job by fostering:

  - the acquisition of the intellectual skills necessary to make correct choices while performing tasks;

  - a concern for communicating politely and effectively with superiors, colleagues and prospective clients;

  - a constant concern for the strict application of occupational health and safety rules;

  - the reinforcement of habits of attention and detail when performing the different tasks related to preparing and finishing concrete, in particular during the installation of materials;

  - the reinforcement of habits of order and cleanliness.

To ensure integration into the job market.

- To familiarize students with their rights and responsibilities as workers.

- To familiarize students with the job market in general, and with the trade of preparing and finishing concrete in particular.

To foster personal development and the acquisition of occupational knowledge.

- To foster independence, a sense of responsibility and the desire to succeed.

- To foster a striving for excellence.

- To encourage the habit of evaluating his or her own finished products.

- To foster an understanding of the principles underlying different formulas for concrete and details of the conditions required for their installation and finishing.

- To help students acquire good work methods and a sense of discipline.

To ensure job mobility.

- To help students develop a positive attitude toward technological change and new situations.

- To help students increase their capacity to learn, seek information and do research.

3. COMPETENCIES

The competencies to be developed in the *Preparing and Finishing Concrete* program are shown in the grid of learning focuses on the following page. The grid lists general and specific competencies as well as the major steps in the work process.

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

The grid of learning focuses shows the relationship between the general competencies on the horizontal axis and the specific competencies on the vertical axis. The symbol (△) indicates a correlation between a specific competency and a step in the work process. The symbol (○) indicates a correlation between a general and a specific competency.

The symbols (▲) and (●) 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. The teaching blocks of the program are organized to take these requirements into account.

GRID OF LEARNING FOCUSES

PREPARING AND FINISHING CONCRETE

	SPECIFIC COMPETENCIES (directly related to the practice of the specific occupation)	FIRST-LEVEL OPERATIONAL OBJECTIVES	DURATION (IN HOURS)	WORK PROCESS (major steps)					GENERAL COMPETENCIES (technology, subjects, personal development, etc.)								TOTALS	
				Prepare to carry out the work	Place concrete	Finish concrete surfaces	Make control joints	Clean up the work area	Describe the nature of the materials and commonly used products	Apply concepts related to concrete	Read plans and specifications related to structures and surfacing	Solve problems of mathematics and measurement	Apply rules of occupational health and safety on construction sites	Communicate effectively in a work team	Become aware of the organizations in the construction industry	Develop good habits and attitudes	NUMBER OF OBJECTIVES	DURATION (IN HOURS)
MODULE	MODULE								2	3	5	8	11	12	14			
	FIRST-LEVEL OPERATIONAL OBJECTIVES								B	B	B	B	S	S	S	•	7	
	DURATION (IN HOURS)								30	45	45	45	30	30	15			240
1	Determine their suitability for the trade and the training process	S	15						○	○	○	○	○	○	○			
4	Place and finish curbs and sidewalks	B	75		▲	▲	▲	△	●	●	○	○	○	○	○			
6	Place and finish slabs of exposed aggregate	B	45	▲	△	▲	▲	△	●	●	○	●	○	○	○			
7	Carry out basic repairs to surfaces of stucco, parging and exposed aggregate	B	30	▲	▲	▲	△		●	●	●	○	○	○	○			
9	Produce stucco and parging surfaces	B	60	▲	▲	▲	▲	▲	●	●	●	○	○	○	○			
10	Install weatherproof membranes	B	60	▲	△	△	△	▲	●		●	○	○	○	○			
13	Install concrete floors	B	120	▲	▲	▲	▲	▲	●	●	●	●	●	●	○			
15	Carry out basic repairs to concrete structures	B	30	▲	▲	▲	△	▲	●	●	●	●	●	○	○			
16	Finish regular and coloured concrete surfaces	B	60	△	△	▲	▲	△	●	●	●	●	●	●	○			
17	Finish surfaces with resin-based epoxy	B	60	▲	▲	△	△	▲	●	○	●	○	●	○	○			
18	Place and finish concrete stairways	B	105	▲	▲	▲		▲	●	●	●	●	●	○	○			
NUMBER OF OBJECTIVES		11															18	
DURATION (IN HOURS)			660															900

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
1
2

4. GENERAL OBJECTIVES

The general objectives of the *Preparing and Finishing Concrete* program are presented below, along with the major statement of each corresponding first-level operational objective.

To develop in the students the basic competencies required to prepare and finish concrete.

- Describe the nature of the materials and commonly used products.
- Apply concepts related to concrete.
- Read plans and specifications related to structures and surfacing.
- Solve problems of mathematics and measurement.

To develop in the students the competencies required for the interpretation of plans, specifications and procedures.

- Determine their suitability for the trade and the training process.
- Apply rules of occupational health and safety on construction sites.
- Communicate effectively in a work team.
- Become aware of the organizations in the construction industry.

To develop in the students the competencies required for preparing and finishing concrete.

- Place and finish curbs and sidewalks.
- Place and finish slabs of exposed aggregate.
- Carry out basic repairs to surfaces of stucco, parging and exposed aggregate.
- Produce stucco and parging surfaces.
- Install weatherproof membranes.
- Install concrete floors.
- Carry out basic repairs to concrete structures.
- Finish regular and coloured concrete surfaces.
- Finish surfaces with resin-based epoxy.
- Place and finish concrete stairways.

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

CODE: 758 681 **Duration: 15 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

EXPECTED OUTCOME

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

SPECIFICATIONS

At the end of this module, the students will:

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

LEARNING CONTEXT

PHASE 1: **Information on the Trade**

- Learning about the job market in the field of preparing and finishing concrete: work environment (types of businesses and products), job prospects, salaries, opportunities for promotion and job change, selection of candidates (visits, interviews, consulting reference material, etc.).

- Learning about the nature and requirements of the trade (tasks, working conditions, evaluation criteria, rights and responsibilities of workers) through visits and interviews, or by consulting reference material.

- Presenting the information gathered in a group meeting and discussing their views on the trade (advantages, disadvantages, requirements).

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

PHASE 2: **Information on and Participation in the Training Process**

- Discussing the skills, attitudes, aptitudes and knowledge required to practise the trade.

- Becoming familiar with the training process (program of study, means of evaluation, certification of studies).

- Discussing how the training program prepares them for work as cement finishers.

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

- Discussing various aspects of the trade of cement finisher.

- Preparing a report in which they:
  - specify their preferences, aptitudes and interests with respect to preparing and finishing concrete;
  - assess their career choice by comparing the nature and requirements of the trade with their preferences, aptitudes and interests.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Create a climate that favours the students' personal growth and integration into the job market.
- Encourage the students to engage in discussions and express their opinions.
- Motivate the students to take part in the suggested activities.
- Help the students to arrive at an accurate perception of the trade.
- Provide the students with the means to assess their career choice honestly and objectively.
- Organize visits to companies that are representative of the workplace in the field of preparing and finishing concrete.
- Make available all pertinent reference materials, e.g. information on the trade, training programs, guides.
- Organize a meeting with specialists in the field.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

PARTICIPATION CRITERIA

PHASE 1:

- Gather information on most of the topics to be covered.
- Adequately express their views on the trade during a group discussion, relating them to the information they have gathered.

PHASE 2:

- Give their opinions on some requirements for practising the trade.
- Study the documents provided.
- Adequately express their views on the training program during a group meeting.
- Clearly express their opinions.

PHASE 3:

- Write a report that:
  - sums up their preferences, aptitudes and qualities;
  - clearly explains how they arrived at their career choice.

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 related to the trade and the training process.
2. Take care to share their perception of the trade with other members of the group.

Before undertaking the activities of Phase 1:

3. Locate information.
4. Establish a method for noting and presenting facts.
5. Distinguish between task and job.
6. Explain what is meant by *entry-level qualifications*.
7. Explain the main rules governing group discussions.

Before undertaking the activities of Phase 2:

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

Before undertaking the activities of Phase 3:

10. Distinguish preferences from aptitudes.
11. Describe the main elements included in a report in which they confirm their career choice.

MODULE 2: NATURE OF MATERIALS AND COMMONLY USED PRODUCTS

CODE: 758 692 **Duration: 30 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must **describe the nature of the materials and commonly used products** in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using appropriate technical documents: standards books, etc.
- Using materials and products commonly used in the trade

GENERAL PERFORMANCE CRITERIA

- Understanding of basic concepts concerning the properties of products
- Use of appropriate terminology
- Correct interpretation of manufacturer's instructions
- Respect for symbols written on materials and products, in accordance with the *Workplace Hazardous Materials Information System (WHMIS)*

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Read and interpret labels of containers related to materials and products used in preparing and finishing concrete.	- Accuracy of interpretations
B. Describe the materials commonly used in the trade.	- Inclusion of all important descriptive elements
C. Distinguish between various surface-treatment products.	- Correct description of products
D. Describe the methods for storing various products and materials.	- Correct choice of storage method - Observance of the principal storage conditions
E. Describe the method for transporting the products and materials used.	- Accurate description according to type of product or material
F. Use the appropriate terms.	- Accuracy of terms

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 read and interpret labels of containers related to materials and products used in preparing and finishing concrete (A):

1. Distinguish between the standards and safety rules related to the use of products and materials in preparing and finishing concrete.
2. Distinguish the symbols written on materials and products, in accordance with the *Workplace Hazardous Materials Information System (WHMIS)*.
3. List effective means of prevention.
4. Use the standards book.

Before learning how to describe the materials commonly used in the trade (B):

5. Distinguish materials commonly used in the trade (other than concrete).

Before learning how to distinguish between various surface-treatment products (C):

6. Recognize surface-treatment products.

Before learning how to describe the methods for storing various products and materials (D):

7. Describe the storage conditions for products and materials.

Before learning how to describe the method for transporting the products and materials used (E):

8. Be familiar with the standard equipment used for handling and transporting products and materials.

MODULE 3: APPLYING CONCEPTS RELATED TO CONCRETE

CODE: 758 703

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
apply concepts related to concrete
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone, for the theory segment
- Working in a team, for the practical segment
- Following directions provided by the instructor
- Using relevant reference materials such as brochures and manufacturers' guides
- Using a tool kit and the required materials and equipment
- On surfaces a minimum of 500 mm X 500 mm X 50 mm thick for applying concrete mixes
- Using prefabricated forms
- In an appropriate environment

GENERAL PERFORMANCE CRITERIA

- In accordance with the directions given
- Good understanding of basic concepts of concrete
- Mastery of work methods
- Application of safety rules
- Respect of quality standards related to the spreading and finishing of concrete
- Use of appropriate terminology

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Define the properties of concrete.	- Statement of the main recognized properties - Precise definition
B. Define certain chemical contaminants contained in cement and concrete.	- List of specific properties - Statement of the dangers involved when cement comes in contact with the skin
C. Measure and mix ingredients.	- Careful selection of basic ingredients - Preparation of desired quantity - Use of equipment for personal protection - Achievement of desired consistency - Precise measurement of ingredients - Correct quantities of synthetic, metallic or other fibres to be added to the mixture - Consideration of the relationship between the nature and quantity of admixtures and their effects on placing and finishing (climatic conditions, transport, etc.) - Mixing of ingredients according to the proper technique

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
D. Place the concrete.	- Spreading of concrete according to the proper technique - Checks before placement
E. Finish concrete surfaces.	- Smoothing of concrete according to the proper technique
F. Explain the technique for finishing shotcrete.	- Accurate description of the stages of the work and the finishing technique used
G. Clean the work area.	- Storage of materials in the proper place - Proper cleaning 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 define the properties of concrete (A):

1. List the ingredients used in preparing cement and concrete.

Before learning how to define certain chemical contaminants contained in cement and concrete (B):

2. List the properties of concrete that can be modified by admixtures during mixing.
3. Name the additives used to modify the properties of concrete.

Before learning how to measure and mix ingredients (C):

4. Recognize the equipment used for mixing concrete on the worksite.
5. Determine the quantities of basic ingredients and admixtures to be used when mixing concrete.
6. Consistently observe the rules of health and safety.

Before learning how to place the concrete (D):

7. Describe the methods for placing concrete.

Before learning how to finish concrete surfaces (E):

8. Distinguish the main types of finish for fresh concrete surfaces.
9. List the tools used for finishing concrete surfaces, indicating the features of their use.
10. Describe the types of finish for regular concrete surfaces.
11. Determine the methods to be used to finish a regular concrete surface.
12. Use a wooden float.

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 technique for finishing shotcrete (F):

13. List the tools used to finish surfaces of shotcrete, indicating the features of their use.
14. Describe the types of finish for shotcrete surfaces.
15. Determine the methods to be used to finish a shotcrete surface.

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

16. Be concerned with the cleanliness of the area and the cleaning of tools and equipment.

MODULE 4: PLACING AND FINISHING CURBS AND SIDEWALKS

CODE: 758 715 **Duration: 75 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
place and finish curbs and sidewalks
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone and with the help of another student
- Working on a project
- Working from data provided by the instructor
- Using a tool kit and the required materials and equipment
- Using prefabricated forms
- Working on L-shaped structures with a minimum width of 1 m and exterior sides measuring at least 2 m X 2 m. These structures must include at least two expansion joints and a ramp for handicapped persons
- In an environment that conforms to standards of ventilation, temperature and lighting

GENERAL PERFORMANCE CRITERIA

- Conformity with data received at start of project
- Measurement of ingredients in correct proportions
- Mastery of concrete-finishing technique, regardless of speed of execution
- Mastery of techniques for using instruments and equipment
- Concern for economic use of raw materials
- Quality of finished product: uniform surfaces
- Cleanliness of working area
- Observance of rules of health, safety and ergonomics

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Ensure protection of workers and the public.	- Work area clear of any objects that could pose a danger - Appropriate arrangement of signs - Safe temporary structures - Practical arrangement of equipment
B. Prepare the subgrade: • determine the location; • level; • fill.	- Correct location - Precision of measurements taken with the level - Clearing of debris and cleaning of materials to be used - Required thickness of gravel - Evenness of surface - Compaction of subgrade
C. Install forms for the construction of curbs, paving stones and sidewalks.	- Conformity with initial data - Solidity of entire structure
D. Place the foundation.	- Gravel spread according to specifications - Uniform compaction of gravel - Placement of expansion joints according to directions - Proper lubrication of forms
E. Prepare the concrete or its substitute (concepts in Module 3).	- Order of preparatory steps - Required consistency and strength - Correct quantity of admixtures by cubic metre
F. Place concrete (concepts in Module 3).	- Appropriate vibration - Proper use of screed, bull float (darby) and wooden float, according to the proper technique - Even surface

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
G. Finish surfaces (concepts in Module 3).	- Polishing at the right time: when concrete is sufficiently set - Proper use of wooden float and finishing irons - Surface finish according to directions
H. Apply a liquid curing membrane.	- Even application of the membrane - Observance of application rate recommended by the manufacturer - Appropriate choice of curing method
I. Remove forms.	- Removal of forms at the proper time: hardening of the concrete - Sequence of operations - Appropriate storage: materials prepared for later use
J. Check the quality of the work.	- Checks for wear - Evaluation at each stage of the work - Establishment and consideration of quality criteria - Proper evaluation of the finished product

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 ensure the protection of workers and the public (A):

1. Describe the tools, equipment and materials necessary for carrying out the work.
2. Explain the logical order of the steps for the installing and finishing of concrete structures (concepts in Module 3).
3. Define the basic rules for protecting work areas, workers and the public.
4. List types of temporary structures in construction.

Before learning how to prepare the subgrade:

- **determine the location;**
- **level;**
- **fill (B):**

5. Distinguish the most commonly used levels.
6. Use the commonly used levels.
7. Use a straightedge (wooden or aluminum screed).
8. Install bricklayer's lines.
9. Use compacting equipment.
10. Explain a method for checking compaction rates.

Before learning how to install forms for the construction of curbs, paving stones and sidewalks (C):

11. Determine the location of forms to be installed.
12. Use procedures to ensure that forms are in conformity with the initial data.

Before learning how to place the foundation (D):

13. Distinguish and install different types of expansion joints.

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 prepare the concrete or its substitute (concepts in Module 3) (E):

14. Determine the admixtures to be used in order to modify the properties of concrete.
15. Determine the health and safety rules applicable to mixing concrete.

Before learning how to place concrete (concepts in Module 3) (F):

16. Determine the precautions to be taken when placing concrete.
17. Determine the volume of the concrete.
18. Describe the method for spreading concrete.
19. Use screeds of different lengths.
20. Explain the components of a system for protecting concrete.
21. Use a wooden float.
22. Use a darby or bull float.

Before learning how to finish surfaces (concepts in Module 3) (G):

23. Explain the methods of levelling and finishing.
24. Manipulate a magnesium float.
25. Manipulate finishing irons.

Before learning how to apply a liquid curing membrane (H):

26. Select the curing technique for the concrete.
27. Select a curing agent.

Before learning to remove forms (I):

28. List the operations involved in removing forms.
29. Describe the methods for removing forms.

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 to check the quality of the work (J):

30. Distinguish the work sequence for the final product.
31. List the criteria for evaluating the work sequence and the finished product.
32. Understand the importance of self-evaluation.

MODULE 5: READING PLANS AND SPECIFICATIONS

CODE: 758 723

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
read plans and specifications related to structures and surfacing
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Working from plans of structures and architectural drawings related to the preparation and finishing of concrete
- Working from specifications related to the preparation and finishing of concrete
- Based on simulations of worksite projects
- Without reference materials

GENERAL PERFORMANCE CRITERIA

- Exact determination of work to be carried out, based on reading plans and specifications
- Correct interpretation of information contained in plans and specifications

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Describe the general information found on a plan.	- Accurate description of each item - Statement of all the general information found on a plan
B. Interpret the codes and symbols related to the preparation and finishing of concrete.	- Accurate interpretation of the following items: - title block - scale - symbols representing the quantities, placement and shape of materials - lines representing ceilings, floors, levels and dimensions
C. Obtain technical information necessary for all the work to be done from the plans and drawings studied.	- Accurate information collected - All information accounted for - Proper reading technique

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 describe the general information found on a plan (A):

1. List the types of information given on a plan.
2. Distinguish different types of plans according to their use.

Before learning how to interpret the codes and symbols related to the preparation and finishing of concrete (B):

3. State the meaning of the symbols and abbreviations appearing on a plan.
4. Differentiate, by their form, the types of lines used in technical drawing.

Before learning how to obtain technical information necessary for all the work to be done from the plans and drawings studied (C):

5. Interpret the various tables appearing on plans, taking into account their applications.
6. Define the purposes of the list of items appearing in an assembly drawing.
7. Differentiate the views of a plan.
8. Form a mental picture of the real dimensions of a space, based on a plan.

MODULE 6: PRODUCING SLABS OF EXPOSED AGGREGATE

CODE: 758 733

Duration: 45 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
place and finish slabs of exposed aggregate
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Using data provided by the instructor
- Using a tool kit and the required materials and equipment
- Working on surfaces of at least 4 m^2, ready to install, and on the finish of slabs at least 75 mm thick
- In an environment that conforms to standards of ventilation, temperature and lighting

GENERAL PERFORMANCE CRITERIA

- Observance of initial data
- Polishing according to proper techniques
- Washing of gravel according to the proper technique
- Correct use of tools and equipment
- Quality of finished product:
  - no marks left by the screed
  - tolerances in accordance with specifications
- Completed within the allotted time
- Use of appropriate terminology
- Observance of health and safety regulations and standards
- Cleanliness of the work area

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Prepare for the work.	- Observance of prescribed data in plans and specifications - Observance of quality control procedure - Appropriate selection and arrangement of materials
B. Place the concrete or its substitute (concepts in modules 3 and 4).	- Regular checks of elevation - Evenness of surface
C. Seed gravel on fresh concrete surfaces.	- Uniform distribution of gravel - Correct seeding technique
D. Finish a surface of exposed aggregate.	- Observance of levels - Flat, uniform surface
E. Apply a setting retarder.	- Uniform evaporation of the product - Observance of the manufacturer's instructions
F. Wash the aggregate.	- Aggregate washed at the right time - Gravel relief in accordance with specifications
G. Describe a finishing method for a Gybraltar floor.	- Description consistent with the task
H. Exercise caution throughout the work.	- Constant protection - Use of personal safety equipment - Diagnosis of equipment problems
I. Check the quality of the work.	- Consistency of quality checks - Understanding of quality criteria

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 prepare for the work (A):

1. Read plans and specifications (concepts in Module 5).
2. Understand the usual standards for ventilation and lighting.
3. State the climatic conditions best for this type of work.

Before learning how to place concrete or its substitute (concepts in modules 3 and 4) (B):

4. Determine the supply rate and volume of concrete (concepts in Module 4).
5. Understand thoroughly the technique for spreading concrete (concepts in modules 3 and 4).
6. Understand thoroughly the techniques for striking off and levelling concrete (concepts in modules 3 and 4).
7. Explain the different methods for installing a floor of exposed aggregate:
   - regular concrete and gravel-seeded surface
   - concrete pre-mixed with gravel at the factory, etc.
8. Use a screed (concepts in Module 4).

Before learning how to finish a surface of exposed aggregate (D):

9. Carry out manual polishing (concepts in modules 3 and 4).
10. Maintain the tools and equipment used.
11. Pay constant attention to the work.

Before learning how to apply a setting retarder (E):

12. List the main setting retarders and indicate their respective areas of application.
13. Describe the methods for applying setting retarders.

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 wash the aggregate (F):

14. Describe the method for washing exposed gravel.
15. Describe the material necessary for washing exposed gravel

Before learning how to describe a finishing method for a Gybraltar floor (G):

16. Describe the polishing stages for this type of finish.
17. Explain the technique for using a polisher.
18. Describe the factors involved in the selection of different polishing stones.
19. Explain a method for grooving and filling joints appropriate to this type of work.

Before learning how to exercise caution throughout the work (H):

20. Acquire habits of order and cleanliness.
21. Describe the rules of health and safety applicable to this type of work.
22. Describe the rules of environmental protection applicable to this type of work.
23. Explain situations that would be dangerous or incompatible with the work to be done.

Before learning how to check the quality of the work (I):

24. Identify the work sequence for the finished product (concepts in Module 4).
25. Understand the importance of ongoing evaluation of the work.

MODULE 7: BASIC REPAIRS TO SURFACES OF STUCCO, PARGING AND EXPOSED AGGREGATE

CODE: 758 742 **Duration: 30 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
carry out basic repairs to surfaces of stucco, parging and exposed aggregate
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Working from data provided by the instructor
- Using a tool kit and the required materials and equipment
- Working on structures of stucco, parging and exposed aggregate with cracks and chips requiring the use of manual and pneumatic demolition tools
- In an environment that conforms to standards of ventilation, temperature and lighting

GENERAL PERFORMANCE CRITERIA

- Observance of initial data
- Correct use of tools and equipment
- Respect for the environment
- Observance of standards pertaining to health, safety and ergonomics
- Use of equipment for personal protection
- Cleanliness of the work area

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	**SPECIFIC PERFORMANCE CRITERIA**
A. Select a repair technique.	- Logical work sequence - Careful choice of tools and equipment - Careful choice of repair materials
B. Demolish damaged parts.	- Extent of the demolition in accordance with the nature of the repairs: - cracks - chips - holes, etc. - Correct use of demolition tools - Observance of safety rules
C. Prepare the surface to be covered.	- Appropriate cleaning of surfaces to be covered - Application of appropriate binding product
D. Prepare the covering material (concepts in Module 2).	- Observance of formula - Observance of proper quantities - Observance of the supply rate
E. Set up the materials.	- Consideration of ambient conditions - Consideration of the shrinkage of materials during the curing period - Careful choice of tools and equipment

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA

F. Finish the repaired surface.	- Final quality of repairs:
	  - evenness of the repaired section
	  - texture consistent with that of the rest of the work
	- Adhesion of the repaired section

G. Exercise caution throughout the work.	- Constant protection - Use of personal safety equipment - Diagnosis of equipment problems
H. Clean the work area.	- Storing of materials in proper place - Cleaning and lubricating 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 select a repair technique (A):

1. Distinguish between the types of breaks to be repaired on the surfaces.
2. List the stages in the repair of surfaces covered with stucco, parging and exposed aggregate.
3. Determine the type of repairs to be done on surfaces covered with stucco, parging and exposed aggregate.
4. Select tools appropriate for the demolition of structures in stucco, parging and exposed aggregate.

Before learning how to demolish damaged parts (B):

5. Explain the operation of demolition tools.
6. Understand the basic techniques for using demolition tools.

Before learning how to prepare the surface to be covered (C):

7. Select the binding products (concepts in Module 2).
8. Prepare the binding products.

Before learning how to prepare the covering material (concepts in Module 2) (D):

9. Explain the method for preparing the covering material.

Before learning how to set up the materials (E):

10. Explain the technique for setting up the repair materials.

Before learning how to finish the repaired surface (F):

11. Explain the details of techniques for finishing repaired surfaces.

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 exercise caution throughout the work (G):

12. Acquire habits of order and cleanliness.
13. Describe the health and safety rules applicable to this type of work.
14. Describe the environmental protection rules applicable to this type of work.
15. Explain situations that would be dangerous or incompatible with the work to be done.

MODULE 8: SOLVING PROBLEMS OF MATHEMATICS AND MEASUREMENT

CODE: 758 753 **Duration: 45 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
solve problems of mathematics and measurement
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Working from geometric figures representing:
  - floors of irregular shape
  - walls with openings
- Working with stairwells requiring calculations for straight stairways
- Working on reality-based problems
- Following an estimated waste percentage

GENERAL PERFORMANCE CRITERIA

- Careful selection of operations
- Accuracy of calculations and measurements

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Specify the expected result.	- Understanding of the elements of the problem
B. Select the operations: • four basic operations • rule of three • perimeter and area of common geometric figures • volume of most commonly used solids	- Appropriate selection of operations
C. Estimate quantities of materials.	- Accuracy of results
D. Estimate volumes of materials.	- Accuracy of results
E. Make measurements using the International System of Units and the imperial system.	- Accuracy of measurements: • plus or minus 2 millimetres for 5 metres • plus or minus 1/8 inch for 10 feet
F. Carry out calculations for straight stairways.	- Accuracy of 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 specify the expected result (A):

1. Interpret a problem.

Before learning how to select the operations:

- **four basic operations**
- **rule of three**
- **perimeter and area of common geometric figures**
- **volume of most commonly used solids (B):**

2. Describe the procedure for solving a problem.

Before learning how to estimate quantities of materials (C):

3. Estimate rough quantities.
4. Estimate quantities of waste materials.

Before learning how to estimate volumes of materials (D):

5. Calculate volumes of aggregates, admixtures and concrete.

Before learning how to make measurements using the International System of Units and the imperial system (E):

6. Use measuring instruments.
7. Transpose measurements.
8. Check squaring using Pythagoras' theorem.

Before learning how to carry out calculations for straight stairways (F):

9. Calculate the elements of a straight stairway.

MODULE 9: PRODUCING STUCCO AND PARGING SURFACES

CODE: 758 764 **Duration: 60 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
produce stucco and parging surfaces
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone or with the help of another student, when necessary
- Working from data in the specifications
- Using a tool kit and the required materials and equipment
- On block walls
- In a simulated situation

GENERAL PERFORMANCE CRITERIA

- Following initial instructions
- Use of the trowel, mortar board and finishing tools, according to the proper technique
- Quality of finished product:
  - evenness of layers
  - texture well-rendered
- Cleanliness of the work area
- Observance of health and safety standards

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Assemble, install and use scaffolding for overhead jobs.	- Straightness of initial elements - Presence of all measures to prevent falls - Stability - Solidity of assemblies - Safe moving techniques - Observance of safety rules applicable to the type of scaffolding
B. Prepare surfaces to receive coverings of: • parging; • stucco.	- Detection of all important elements to be corrected - Repairs carried out so as to ensure the final quality of the surface - Appropriate cleaning of the equipment and the work area
C. Prepare mortar mixture for the parging surface.	- Proportions according to plans and specifications - Homogeneous mixture - Proper mixing technique
D. Cover the prepared surface with mortar (parging).	- Use of a trowel and mortar board according to the proper technique - Evenness of coats - Well-produced texture and finish

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
E. Cover the prepared surface with stucco.	- Observance of health and safety rules - Appropriate adjustment of stucco machine - Logical order of work stages - Observance of number of coats required - Evenness of surface - Appropriate cleaning 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 assemble, install and use scaffolding for overhead jobs (A):

1. List the types of interior and exterior scaffolding used in construction.
2. Classify the main components of a scaffold according to function, position, stability and support.
3. Select the accessories for personal safety used in overhead jobs.
4. Describe the procedures used to assemble the various components of a scaffold.
5. Determine the scaffold construction standards to be observed, according to selected criteria.
6. Plan the operations to be carried out in erecting a scaffold.

Before learning how to prepare surfaces to receive coverings of:

- **parging;**
- **stucco (B):**

7. Check the solidity of the metal lath.
8. Detect imperfections on all types of surface to be layered.
9. Indicate the operations to be carried out to prepare a surface for layering.
10. Choose the products used to correct faults in a surface to be layered.
11. Read plans and specifications (concepts in Module 5).
12. Take measurements and calculate quantities of products to be used (concepts in Module 8).

Before learning how to prepare mortar mixture for the parging surface (C):

13. Distinguish between methods for preparing mortars.
14. State the rules to be followed in preparing mortars in order to obtain the desired qualities.
15. Indicate the qualities of a parging mortar.

Before learning how to cover the prepared surface with mortar (parging) (D):

16. Use a trowel and a mortar board.

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 cover the prepared surface with stucco (E):

17. Determine the method for applying the stucco adhesive.
18. Apply the stucco adhesive to the surface to be covered.
19. Select the material required for applying the stucco.
20. Take shades of colour into account.

MODULE 10: INSTALLATION OF WEATHERPROOF MEMBRANES

CODE: 758 774

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
install weatherproof membranes
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Working from installation plans or specifications
- Following directions from the instructor
- On surfaces of a minimum dimension of 1.5 m x 4 m
- Using the manufacturer's guide
- Using the appropriate tools, equipment and materials
- Using scaffolds already assembled and installed
- In an environment that conforms to standards of ventilation, temperature and lighting

GENERAL PERFORMANCE CRITERIA

- Observance of standards governing the use of scaffolds
- Following installation techniques
- Logical work sequence
- Caution and attention in handling materials, hoisting equipment and products
- Observance of time allotted
- Final quality of product: impermeability, appearance
- Observance of rules of health, safety and ergonomics

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Prepare to carry out the work.	- Observance of handling standards - Proper environmental protection - Proper installation of materials
B. Prepare surfaces to receive membranes.	- Observance of stages of the operation - Cleanliness - Sufficient drying - Uniformity
C. Install a membrane of elastomeric bitumen.	- Proper use of torch (flame thrower) - Waterproof joints
D. Carry out a hot application of a rubberized elastomeric membrane.	- Proper use of mop - Evenness of surface
E. Carry out a cold application of a rubberized elastomeric membrane.	- Proper use of trowel and brush or hand-held roller
F. Evaluate the quality of work carried out.	- Consideration of all important criteria - Proper evaluation

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 prepare to carry out the work (A):

1. Obtain, from specifications, the technical information necessary to install and repair a weatherproof membrane.
2. Form a mental picture of the work, based on plans and specifications.
3. Recognize materials and equipment in poor condition.
4. List mechanical hoisting and handling devices and the features of their use.
5. List the accessories for the basic hoisting and handling devices.
6. List the precautions to take for hoisting and handling.
7. Install scaffolds and temporary structures.
8. List measures to be taken to protect the environment.
9. Estimate the required quantity of materials.
10. Describe membranes and similar products.

Before learning how to prepare surfaces to receive membranes (B):

11. Use a torch (flame thrower).

Before learning how to install a membrane of elastomeric bitumen (C):

12. Describe the method for installing a membrane of elastomeric bitumen.
13. Describe the technique for installing a vapour barrier, insulating material and flashings.

Before learning how to carry out a hot application of a rubberized elastomeric membrane (D):

14. Describe the method for hot application of an elastomeric membrane.
15. Use a mop.

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 carry out a cold application of a rubberized elastomeric membrane (E):

16. Describe the method for cold application of an elastomeric membrane.
17. Use a trowel and a brush.

Before learning how to evaluate the quality of work carried out (F):

18. List the precautions to be taken to ensure the quality of the work.
19. List the quality standards related to the installation of weatherproof membranes.
20. Be careful to use the proper techniques.

MODULE 11: OCCUPATIONAL HEALTH AND SAFETY ON CONSTRUCTION SITES

CODE: 755 002 **Duration: 30 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 rules of occupational health and safety on construction sites.

SPECIFICATIONS

At the end of this module, the students will:

- Understand the legal framework regulating occupational health and safety on the construction site.
- Understand the roles and responsibilities of persons in charge of occupational health and safety.
- Understand the risks involved in carrying out certain jobs and the preventive measures that apply.
- Understand the general risks present on a construction site and the preventive measures that apply.
- Understand the risks involved in the use of certain products and the preventive measures that apply.
- Understand the measures to be taken in case of accident.

LEARNING CONTEXT

PHASE 1: **Information**

- Learning about the objective of the training unit and the accompanying guide.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

LEARNING CONTEXT

PHASE 2: **Assimilation**

- Gathering information on the topic.
- Making a judgement and expressing an opinion on the subject.
- Asking questions.
- Discerning the main concepts and basic principles of safe behaviour.
- Evaluating their adherence to these principles.

PHASE 3: **Reinforcement**

- Reviewing the elements and concepts important to the unit.
- Answering a questionnaire.
- Validating answers and discussing them, where applicable.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Ensure the availability of a practical site and adequate materials.
- Present the content in a stimulating manner.
- Encourage group discussion.
- Make full use of instructional materials (charts, transparencies, films, videos, information sheets, etc.).

PARTICIPATION CRITERIA

- Participate in at least 18 of the 20 training units. Units 1 and 2 are compulsory.
- Listen attentively.
- Participate in discussions of the topics covered.
- Ask questions and give appropriate answers.
- Answer the exercise.
- Correct the exercise.

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: (Information)

1. Be receptive to information pertaining to occupational health and safety.
2. Share one's knowledge with other people in the group.

Before undertaking the activities of Phase 2: (Assimilation)

3. Locate items of information.
4. Find a way of presenting data.
5. Explain the principal rules for taking part in group discussion.

Before undertaking the activities of Phase 3: (Reinforcement)

6. Describe how to respond to a questionnaire.

MODULE 12: COMMUNICATION IN THE WORKPLACE

CODE: 758 782 **Duration: 30 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

EXPECTED OUTCOME

By participating in the required activities of the learning context according to the following conditions, criteria and specifications, the students will be able to **communicate effectively in a work team.**

SPECIFICATIONS

At the end of this module, the students will:

- Understand the process of communication.
- Distinguish between functioning in a group and functioning alone.
- Acquire skills that enable them to communicate more effectively in a work group.

LEARNING CONTEXT

PHASE 1: **Information**

- Using written and audiovisual documents to become informed about the communication process.
- Examining reference materials to research and list ways in which effective communication is fostered or hindered.
- Recognizing, in learning contexts, the factors that foster or hinder effective communication.
- Examining reference materials to research and recognize in learning contexts the characteristics of effective group work.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

PHASE 2: **Participation**

- Using a grid to note their attitudes and behaviours in communication situations.
- Recognizing, in the course of a learning context, their own strengths and weaknesses in a work group.

PHASE 3: **Self-evaluation**

- Appreciating their progress toward the selected goal during a group discussion.

INSTRUCTIONAL GUIDELINES

The teacher should:

- Create a friendly atmosphere encouraging tolerance and the exchange of ideas among persons in the group.
- Have the student participate in the proposed activities.
- Favour a group-leadership approach.
- Ensure the availability of relevant means and reference materials: exercises, learning contexts, texts, etc.
- Take into account each individual's situation.

PARTICIPATION CRITERIA

PHASE 1:

- Draw up a list of features and obstacles.
- Participate actively in learning contexts.

PHASE 2:

- Participate actively in learning contexts.
- Fill in a grid of observed attitudes and behaviours.
- Draw up a list of strong and weak points.

PHASE 3:

- Be willing to discuss with other members of the group their perceptions of themselves as a communicators.

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 related to communication.
2. Make efforts to understand themselves in a communication context.
3. Make efforts to discover their own attitudes in a work group.

Before undertaking the activities of Phase 1 (Information):

4. Understand the importance of effective communication in a work group.
5. Distinguish teamwork from individual work within a group.

Before undertaking the activities of Phase 2 (Participation):

6. Describe the communication process.
7. List the main obstacles to quality communication.

Before undertaking the activities of Phase 3 (Self-evaluation):

8. Make efforts to share their self-perceptions as communicators with the other members of the group.

MODULE 13: INSTALLATION OF CONCRETE FLOORS

CODE: 758 798 **Duration: 120 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
install concrete floors
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working from detailed plans and specifications for the work to be carried out
- Working from directions provided by the instructor
- On a surface at least 6 m x 6 m in area
- Using a tool kit and the required materials and equipment
- Using a laser level to place the spots
- Using a screed at least 2.5 m long to strike off excess concrete
- In an environment that conforms to standards of ventilation, temperature and lighting
- Using a foundation already prepared
- In a team of four: each student must carry out each operation in rotation in order to be evaluated on all phases of the work

GENERAL PERFORMANCE CRITERIA

- Observance of plans and specifications
- Following the directions of the instructor
- Proper use of tools and equipment
- Observance of standards of health, safety and ergonomics
- Respect for the environment

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Prepare to carry out the work.	- Observance of directions given in plans and specifications - Appropriate selection and arrangement of materials
B. Install the wire mesh, vapour barrier and insulating material.	- Installation and overlapping of the mesh according to plans and specifications - Placement and overlapping of the vapour barrier according to plans and specifications - Installation of insulating material according to specifications
C. Prepare the concrete or its substitute (concepts in modules 3 and 8).	- Precision of the theoretical calculations for materials - Proper loading and mixing of ingredients - Slump of the concrete according to specifications - Observance of formula for the concrete
D. Spread the concrete.	- Observance of correct working technique - Evenness of surface - Thickness in accordance with level required - Respect for work carried out by other trades - Proper use of tools and equipment - Appropriate vibration

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
E. Place the spots.	- Proper use of laser level - Levels in accordance with plans and specifications • elevation • slopes - Placement of spots • position • sufficient number
F. Screed to the desired level.	- Proper use of screed - Evenness of surface: • absence of voids in the concrete • even surface • observance of spots (levels)
G. Work carefully throughout the job.	- Use of personal protection equipment - Careful attention to ergonomic considerations - Careful attention to obstacles encountered when moving
H. Check the quality of the work.	- Regular checking - Understanding of quality criteria

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 prepare to carry out the work (A):

1. Read the plans and specifications (concepts in Module 5).
2. Calculate the quantities of materials (concepts in Module 8).
3. List the usual standards for ventilation, temperature and lighting.
4. Describe the method for placing concrete or its substitute.
5. Select the tools and equipment necessary for placing concrete.

Before learning how to install the wire mesh, vapour barrier and insulating material (B):

6. Explain the method for installing the wire mesh and the vapour barrier: unrolling, placement, anchoring.
7. Explain the method for installing insulation: placement, joints, anchoring.

Before learning how to prepare the concrete or its substitute (concepts in modules 3 and 8) (C):

8. Determine the rate of supply and the volume of the concrete.
9. Describe the ingredients and their proportions in the volume of concrete to be prepared, taking into account the requirements of the specifications and the ambient conditions.

Before learning how to spread the concrete (D):

10. Explain the method for placing concrete.

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 place the spots (E):

11. Explain the different techniques for placing the spots.
12. Name the components of the laser level.
13. Explain the method for placing the spots.
14. Explain the operation of a laser level.
15. Explain the operation of a water level and a surveyor's level.
16. Check spots at different levels.

Before learning how to screed to the desired level (F):

17. Use screeds of various lengths.
18. Describe the method of operation of the most commonly used vibrating screeds (power screeds).
19. Describe the method for checking and maintaining a vibrating screed and a highway straightedge.

Before learning how to work carefully throughout the job (G):

20. Coordinate their work with that of their team mates.
21. Develop habits of order and cleanliness.
22. Describe the rules of occupational health, safety and ergonomics applicable to the installation of concrete.
23. Describe the standards for ventilation, temperature and lighting required to carry out the work.

Before learning how to check the quality of the work (H):

24. List the criteria for a quality installation.

MODULE 14: ORGANIZATIONS IN THE CONSTRUCTION INDUSTRY

CODE: 755 001

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
become aware of the organizations in the construction industry.

SPECIFICATIONS

At the end of this module, the students will:

- Identify the principal roles and responsibilities of employer and employee associations and organizations.
- Describe the laws and regulations governing labour relations in the construction industry.

LEARNING CONTEXT

PHASE 1: **Information**

- Learning about the objective of the unit in the guide.

PHASE 2: **Learning**

- Receiving information on the topic.
- Expressing an opinion on the topic and asking questions.

PHASE 3: **Reinforcement**

- Reviewing the important concepts of the unit.
- Working individually to answer a series of questions.
- Correcting answers in a group situation.

FIRST-LEVEL OPERATIONAL OBJECTIVE
SITUATIONAL OBJECTIVE

INSTRUCTIONAL GUIDELINES

The teacher should:

- Provide a practical site and appropriate materials.
- Present the content in a stimulating manner.
- Encourage group discussion.
- Make use of charts and illustrations.

PARTICIPATION CRITERIA

- Participate in 7 of the 9 units.
- Listen attentively.
- Participate in discussions of the topics.
- Ask questions and give relevant answers.
- Do the exercise.
- Correct the exercise.

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 (Information):

1. Be receptive to information on the organizations in the construction industry.
2. Express an interest in sharing their knowledge with the rest of the group.

Before undertaking the activities of Phase 2 (Learning):

3. Explain the principal rules of group discussion.

Before undertaking the activities of Phase 3 (Reinforcement):

4. Describe the technique for answering a series of questions.

MODULE 15: BASIC REPAIRS TO CONCRETE STRUCTURES

CODE: 758 802 **Duration: 30 hours**

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
carry out basic repairs to concrete structures
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Based on data supplied by the instructor
- Using a tool kit and the required materials and equipment
- On concrete floors and stairways containing cracks, chips and uneven levels
- In an environment that conforms to standards of ventilation, temperature and lighting

GENERAL PERFORMANCE CRITERIA

- Following initial data
- Using tools and equipment according to the proper technique
- Respecting the environment
- Respecting standards of health, ergonomics and safety
- Using equipment for personal protection
- Cleanliness of the work area

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Select the repair technique.	- Logical work sequence - Appropriate choice of tools and equipment - Appropriate choice of repair materials
B. Demolish damaged parts.	- Extent of demolition in accordance with the nature of repairs: • cracks • chips - Proper use of demolition tools - Observance of safety rules
C. Prepare the surface to be covered.	- Appropriate cleaning of surfaces to be covered - Appropriate protection of surroundings - Application of appropriate binding product
D. Prepare the covering material (concepts in Module 2).	- Careful choice of covering material - Correct use of formula - Correct quantities - Observance of the supply rate
E. Install the material.	- Consideration of the ambient conditions - Consideration of shrinkage of materials during curing - Appropriate choice of tools and equipment

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
F. Finish the repaired surface.	- Logical work sequence - Final quality of repairs: • evenness of repaired section • texture consistent with that of the overall structure • application of sealant coat according to indications - Adhesiveness of repaired section - Cleanliness
G. Exercise caution throughout the work.	- Constant protection - Use of equipment for personal protection - Diagnosis of equipment problems
H. Clean the work area.	- Material stored in proper place - Cleaning and lubrication 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 select the repair technique (A):

1. Differentiate the types of surface flaws to be repaired.
2. List the steps involved in repairing concrete floors damaged by:
   - rain
   - frost
   - shifting ground levels
   - physical transformations
   - water seepage
3. List the steps involved in repairing various concrete structures:
   - walls
   - tunnels
   - water reservoirs
   - foundations
4. Indicate the places where repairs may be made with epoxy.
5. Select the tools used for demolishing concrete structures.

Before learning how to demolish damaged parts (B):

6. Explain the function of the pneumatic drill.
7. Use demolition tools.

Before learning how to prepare the surface to be covered (C):

8. Prepare a surface for epoxy repairs.
9. Select bonding products (concepts in Module 2).
10. Prepare bonding products.
11. Explain the technique for dampening concrete.
12. Describe the method for applying a bonding coat.

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 prepare the covering material (concepts in Module 2) (D):

13. Know the different covering materials and their applications:
    - concrete: quick-setting, watertight, dampened, non-shrink, injected;
    - epoxy resin;
    - latex-base mixtures: thin coverings, bonding agent, weatherproofing agent.
14. Explain the method for preparing covering materials.

Before learning how to install the material (E):

15. Explain the technique for installing repair materials.

Before learning how to finish the repaired surface (F):

16. Explain the particular features of techniques for finishing repaired surfaces.

Before learning how to exercise caution throughout the work (G):

17. Acquire habits of order and cleanliness.
18. Describe the rules of occupational health and safety applicable to this type of work.
19. Describe the rules for protecting the environment applicable to this type of work.
20. Explain situations that could be dangerous or incompatible with the work to be done.

MODULE 16: FINISHING REGULAR AND COLOURED CONCRETE SURFACES

CODE: 758 814

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
finish regular and coloured concrete surfaces
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone or with the help of another student
- Working from indications in the plans and specifications
- Using a tool kit and the required materials and equipment
- On surfaces of at least 36 m^2 in area, allowing for the use of a motorized polisher
- On slabs or toppings of already poured concrete

GENERAL PERFORMANCE CRITERIA

- According to the plans and specifications
- Proper polishing technique
- Quality of finished product: smooth surface
- Observance of rules of occupational health, safety and ergonomics
- Cleanliness of the work area
- Observance of time periods between stages of the work

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Prepare the products to incorporate into surfaces of fresh concrete during the finishing work.	- Observance of proportions: proper technique for measuring surfaces - Conformity with the plans and specifications
B. Polish surfaces with a steel trowel: manual polishing (concepts in modules 3 and 4).	- Quality of polishing - Smooth surface - Proper technique for using the steel trowel
C. Apply hardening products.	- Minimum rate of application respected - Regular and even application of products - Appropriate ventilation
D. Carry out polishing with a power trowel.	- Control of the machine - Appropriate technique for moving the machine - Safe use of the polisher - Quality of surface during operations: • polishing • smoothness

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
E. Apply curing agents.	- Observance of minimum conditions for application - Regular and even application of products - Appropriate ventilation
F. Make control joints.	- Proper use of a grooving saw - Accuracy of sawing lines - Clean cuts
G. Fill the control joints.	- Observance of manufacturer's directions - Correct filling technique - Appropriate levelling of material - Cleaning of working surfaces, tools and 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 prepare the products to incorporate into surfaces of fresh concrete during the finishing work (A):

1. Read plans and specifications (concepts in Module 5).
2. Measure surfaces (concepts in Module 8).
3. Describe methods for finishing fresh concrete surfaces (concepts in Module 3).
4. List the tools used for finishing fresh concrete surfaces (concepts in modules 3 and 4).
5. Determine the products to be incorporated in fresh concrete surfaces during the finishing work.
6. Follow the safety rules applicable throughout the work.

Before learning how to polish surfaces with a steel trowel: manual polishing (concepts in modules 3 and 4) (B):

7. Use a wooden float (concepts in modules 3 and 4).
8. Describe the method for levelling and polishing.
9. Use a steel trowel (concepts in modules 3 and 4).

Before learning how to carry out polishing with a power trowel (D):

10. Know the different types of power trowels.
11. Operate a power trowel.

Before learning how to apply curing agents (E):

12. Assess the quality of a finished floor.

Before learning how to make control joints (F):

13. Use a grooving saw.

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 fill the control joints (G):

14. Select the required materials for filling saw grooves.

MODULE 17: FINISHING SURFACES WITH EPOXY RESIN

CODE: 758 824

Duration: 60 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
finish surfaces with resin-based epoxy
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Based on plans
- Using the manufacturer's guide and other technical documents
- Using a tool kit and the required materials and equipment
- In a well-lit and well-aired environment

GENERAL PERFORMANCE CRITERIA

- Autonomy in organizing the work
- Complete description of dangers and means of prevention
- Proper application of finishing products
- Economy of materials used
- Careful choice of mixture components
- Work sequence
- Use of appropriate terminology
- Respect for health and safety standards

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Read the plan and understand the manufacturer's instructions.	- Correct interpretation of data - Precise determination of type of finish
B. Prepare the basic surface.	- Acid mixture according to plans and specifications (5-10% in water) - Proper use of the sander - Proper application of acid - Roughness of surface: • well rinsed • no acid deposit - Installation of end strips or spacers at the control joints and terminals in accordance with the plans and specifications
C. Prepare the mixture of epoxy resin for a finish of the Sandfill type.	- Correct proportions - Observance of manufacturer's instructions - Correct mixing time - Proper consistency of the mixture - Exact quantity of mixture
D. Prepare the mixture of epoxy resin for a finish of the Quartz type.	- Correct proportions - Observance of manufacturer's instructions - Correct mixing time - Proper consistency of the mixture - Exact quantity of mixture

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
E. Apply the finishing coat.	- Quality of surface sanding - Observance of the application standard indicated in the specifications - Uniform thickness of coats - Application at correct time - Observance of the prescribed time limit
F. Finish the surface.	- Resistance and lustre of the protective coat - Evenness of surface - Cleanness of surface
G. Apply basic rules of occupational health and safety.	- Observance of rules - Wearing of protective clothing - Adequate protection of the environment

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 read the plan and understand the manufacturer's instructions (A):

1. Differentiate the finishing plasters commonly used in the trade (concepts in Module 2).
2. Understand the symbols of the plans and specifications (concepts in Module 5).
3. Calculate surfaces and volumes (concepts in Module 8).

Before learning how to prepare the basic surface (B):

4. Describe the technique for sanding and pumicing surfaces.
5. List the rules of occupational health and safety pertinent to the work of sanding or pumicing.
6. Sand or pumice surfaces in preparation for the required finishing treatment.
7. Describe the technique of shotblasting.

Before learning how to finish the surface (F):

8. Make saw cuts and fill them (concepts in Module 13).

Before learning how to apply basic rules of occupational health and safety (G):

9. Distinguish the work sequence for the finished product (concepts in Module 4).
10. Understand the importance of evaluating the quality of the work.
11. Acquire the habit of protecting their health when using harmful products.

MODULE 18: PLACING AND FINISHING CONCRETE STAIRWAYS

CODE: 758 837

Duration: 105 hours

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

EXPECTED BEHAVIOUR

To demonstrate the required competency, the students must
place and finish concrete stairways
in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working alone
- Working from plans and specifications
- Using forms already installed
- Following directions received from the instructor
- Using a tool kit and the required materials and equipment
- Using information taken from the manufacturer's guide or other relevant documents
- In an appropriate environment

GENERAL PERFORMANCE CRITERIA

- Work done according to the plans and specifications
- Observance of directions received
- Appropriate preparation of the work
- Mastery of working techniques
- Accurate balance of stairway
- Cleanness of surface
- Accuracy of work
- Observance of occupational health and safety standards
- Cleanliness and order in the work area
- Caution in handling products and materials

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	SPECIFIC PERFORMANCE CRITERIA
A. Read plans and specifications.	- Gathering together of necessary information
B. Prepare to carry out the work.	- Exact calculation of the course of the stairway (according to plans) - Exact determination of the type of finish called for - Presence of all materials required - Adequate ventilation and lighting - Clear signs indicating traffic changes
C. Place and finish concrete in the steps of a metal stairway.	- Appropriate cleaning of metal steps - Observance of the slope - Consistency of mix - Finish of concrete in accordance with specifications - Incorporation of a non-metallic, coloured or non-coloured hardening agent, according to the specifications
D. Place the concrete and finish a monolithic structural stairway.	- Observance of the slope of the steps - Proper consistency of mix - Observance of setting time - Quality of finish of border joints on the corners of the steps - Concrete finished according to the specifications

FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE

SPECIFICATIONS OF THE EXPECTED BEHAVIOUR	**SPECIFIC PERFORMANCE CRITERIA**
E. Cover and finish a stairway and a terminal with a topping of wet concrete.	- Observance of the dimensions of each step - Observance of the degree of incline of the riser - Perfect adhesion of the tile or anti-skid strips - Concrete finished according to the specifications - Cleanness of the work
F. Evaluate the quality of the work.	- Consistency throughout the stages of the work - Observance of quality criteria

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 read plans and specifications (A):

1. Understand the symbols for plans and specifications (concepts in Module 5).

Before learning how to prepare to carry out the work (B):

2. Do stairway calculations (concepts in Module 8).
3. Verify the levels (concepts in modules 4 and 8).
4. Describe the standards of ventilation and lighting applicable to the type of work to be done.

Before learning how to place and finish the concrete in the steps of a metal stairway (C):

5. Measure and mix concrete (concepts in modules 3, 4 and 16).
6. Install a wire mesh (concepts in Module 6).
7. Level the concrete with a wooden float (concepts in modules 3, 4 and 16).
8. Polish a concrete surface according to the desired finish (concepts in modules 4, 6 and 16).

Before learning how to place the concrete and finish a monolithic structural stairway (D):

9. Describe the method for placing and finishing a monolithic structural stairway.
10. Describe the method for installing joints in steps of hardened concrete.

Before learning how to cover and finish a stairway and a terminal with a topping of wet concrete (E):

11. Finish steps with anti-skid materials.

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 the work (F):

12. Distinguish between process and product (concepts in Module 4).
13. List the quality standards related to the placement and finish of concrete stairways.

Gouvernement du Québec
Ministère
de l'Éducation

17-0707-01A