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PROGRAM OF STUDY

Auto Bodywork (DVS 5872)

TRAINING SECTOR: MOTORIZED EQUIPMENT MAINTENANCE

Votre gouvernement

Québec

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Introduction to the Program

In vocational training, a program of study presents the competencies required to practise a given trade or occupation at entry level on the job market. The training provided allows students to acquire a degree of versatility that will be useful in their career and personal development.

A program is a coherent set of competencies to be developed. It outlines the knowledge and broad orientations to be favoured during training. The competencies correspond to the tasks of the trade or occupation or to activities related to work, vocational or personal life, depending on the case. Learning is acquired in a specific achievement context and targets the ability to act, succeed and evolve.

According to the *Education Act*,[1] every program "shall include compulsory objectives and contents and may include optional objectives and contents that shall be enriched or adapted according to the needs of students who receive the services." For behavioural competencies, the compulsory components include the statement of the competency, the elements of the competency, the achievement context and the performance criteria; for situational competencies, they include the corresponding components.

For information purposes, programs also provide a grid of competencies, educational aims, a summary of competency-related knowledge and know-how, and guidelines. They also specify the suggested duration of each competency. All optional components of a program may be enriched or adapted according to the needs of the students, the environment and the workplace.

Program Components

Program Goals

Program goals consist of the expected outcome at the end of training as well as a general description of a given trade or occupation. They also include the four general goals of vocational training.

Educational Aims

Educational aims are broad orientations to be favoured during training in order to help students acquire intellectual or motor skills, work habits or attitudes. Educational aims usually address important aspects of career and personal development that have not been explicitly included in the program goals or competencies. They serve to orient appropriate teaching strategies to contextualize students' learning, in keeping with the dimensions underlying the practice of a trade or occupation. They help guide educational institutions in implementing the program.

Competency

A competency is the ability to act, succeed and evolve in order to adequately perform tasks or activities related to one's working or personal life, based on an organized body of knowledge and skills from a variety of fields, perceptions, attitudes, etc.

A competency in vocational training can be defined in terms of a behaviour or a situation and includes specific practical guidelines and requirements for learning.

[1] *Education Act*, CQLR, c. I-13.3, s. 461

1. Behavioural Competency

A behavioural competency describes the actions, and the results expected of the student. It consists of the following features:

- The *statement of the competency* is the result of the job analysis, the orientations and general goals of vocational training and other determinants.
- The *elements of the competency* correspond to essential details that are necessary in order to understand the competency and are expressed in terms of specific behaviours. They refer to the major steps involved in performing a task or to the main components of the competency.
- The *achievement context* corresponds to the situation in which the competency is exercised at entry-level on the job market. The achievement context attempts to recreate an actual work situation but does not describe a learning or evaluation situation.
- The *performance criteria* define the requirements to be respected. They may refer to elements of the competency or to the competency as a whole. When associated with a specific element, performance criteria are used to judge whether a competency has been acquired. When associated with the competency as a whole, the criteria describe the requirements for performing a task or activity and provide information on the expected level of performance or the overall quality of a product or service.

2. Situational Competency

A situational competency describes the situation in which students are placed to acquire learning and allows for actions and results to vary from one student to another. It consists of the following features:

- The *statement of the competency* is the result of the job analysis, the orientations and general goals of vocational training and other determinants.
- The *elements of the competency* outline the essential aspects of the competency and ensure a better understanding of the competency with respect to the expected outcome. The elements of the competency are fundamental to the implementation of the learning situation.
- The *learning context* provides a broad outline of the learning situation designed to help the students develop the required competency. It is normally divided into three key phases of learning: information, participation and synthesis.
- The *instructional guidelines* provide reference points and means for teachers to ensure that learning takes place and that the context in which it occurs is always the same. These guidelines may include general principles or specific procedures.
- The *participation criteria* describe requirements that the students must meet when participating in learning activities. 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 situation.

Competency-Related Knowledge and Know-How

Competency-related knowledge and know-how, together with related guidelines, are provided for information purposes. Competency-related knowledge and know-how define the essential and meaningful learning that students must acquire in order to apply and continue to develop the competency. They are in keeping with the job market and are accompanied by guidelines that provide information about the field of application, level of complexity and learning content. They generally encompass learning associated with knowledge, skills, strategies, attitudes, perceptions, etc.

Duration

The total duration of the program is compulsory and must be observed. It consists of teaching time, which includes time for the evaluation of learning and for enrichment or remedial activities, depending on the students' needs. The duration indicated for a given competency refers to the amount of time needed to develop the competency.

The amount of teaching time corresponds to the amount of time allotted to training, which is established during program development as the average amount of time needed to acquire a competency and evaluate learning. This duration is helpful in organizing training.

Credit

A credit is a unit used for expressing the quantitative value of each competency. One credit corresponds to 15 hours of training.

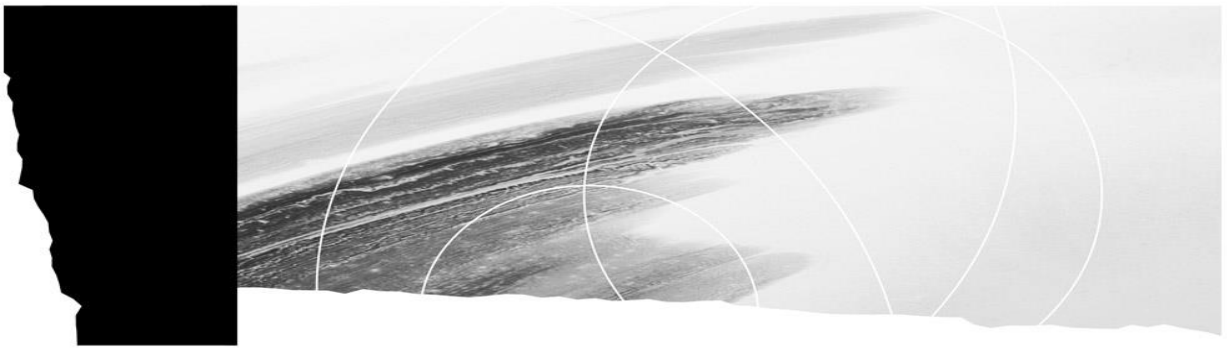
Aspects of Program Implementation

Program-Based Approach

The program-based approach is founded on a comprehensive view of a program of study and its components (e.g. goals, educational aims, competencies). It requires concerted action among all players involved, from the initial stages of program design and development to program implementation and evaluation. It consists in ensuring that all the actions and activities proposed are based on the same aims and take into account the same orientations. For students, the program-based approach makes training more meaningful, since it presents learning as a coherent whole.

Competency-Based Approach

In vocational training, the competency-based approach is based on a teaching philosophy that is designed to help students mobilize their own individual sets of resources in order to act, succeed and evolve in different contexts, according to established performance levels with all the required knowledge and know-how (e.g. skills, strategies, attitudes, perceptions). The competency-based approach is adopted in situations that are relevant to the students' working life and personal life.



5872	**Auto Bodywork**

Year of approval: 2019

Certification:	Diploma of Vocational Studies
Number of credits:	110
Number of competencies:	21
Total duration:	1 650 hours

To be eligible for admission to the *Auto Bodywork* program, candidates must meet one of the following requirements:

- Persons holding a Secondary School Diploma or its recognized equivalent.

OR

- Persons who are at least 16 years of age on September 30 of the school year in which they begin their training must have obtained Secondary IV credits in language of instruction, second language and mathematics in programs established by the Minister, or have been granted recognition of equivalent learning.

OR

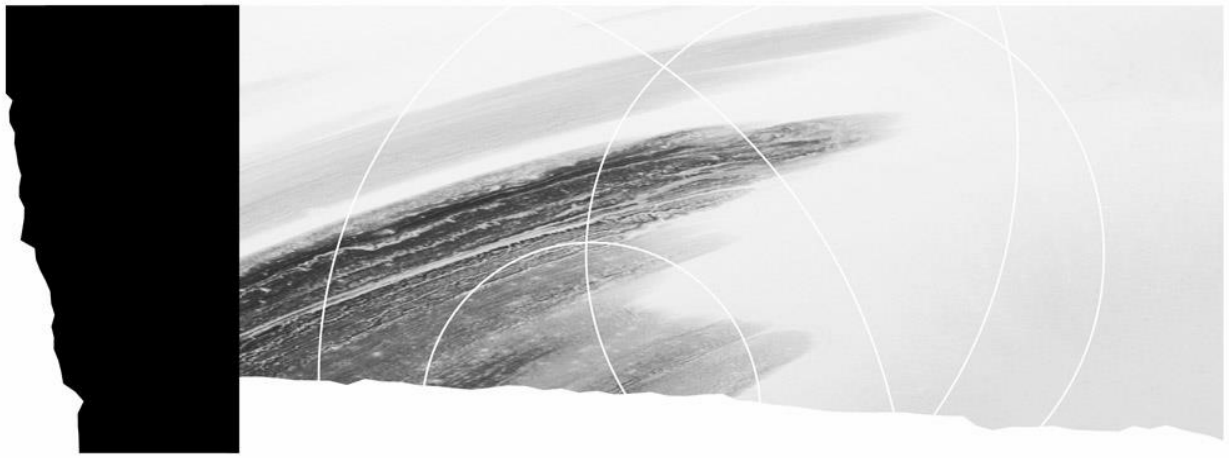
- Persons who are at least 18 years of age upon entry into the program must have the following functional prerequisites: the successful completion of the general development test and ENG-2102-4 and MTH-2102-3, or recognition of equivalent learning.

OR

- Persons who have obtained Secondary III credits in language of instruction, second language and mathematics in programs established by the Minister are required to pursue general education courses, concurrently with their vocational training, in order to obtain the Secondary IV credits, they lack in language of instruction, second language and mathematics in programs established by the Minister.

The duration of the program is 1 650 hours, which includes 1 200 hours spent on the specific competencies required to practise the trade and 450 hours on general, work-related competencies. The program of study is divided into 21 competencies, which vary in length from 15 to 120 hours. The total hours allocated to the program include time devoted to teaching, evaluation of learning and enrichment or remedial activities.

Competency	Code	Number	Hours	Credits
The Trade and the Training Process	845301	1	15	1
Health, Safety and Environmental Protection	845312	2	30	2
Shop Work	845324	3	60	4
Analyzing Vehicle Damage	845334	4	60	4
Replacing Removable Body Panels and Related Elements	845343	5	45	3
Heating, Cutting and Welding	845356	6	90	6
Repairing Plastic Components	845364	7	60	4
Fabricating and Installing Replacement Parts	845374	8	60	4
Testing Electrical and Electronic Systems	845386	9	90	6
Testing Electronic Control Systems	845394	10	60	4
Replacing Glass and Related Elements	845403	11	45	3
Repairing Electrical, Safety and Driver Assistance Systems	845417	12	105	7
Removing and Installing Mechanical Systems	845427	13	105	7
Straightening and Repairing Frames	845438	14	120	8
Replacing Fixed Body Panels and Related Elements	845448	15	120	8
Repairing Dents and Body Panels	845458	16	120	8
Applying Primer	845468	17	120	8
Colorimetry	845473	18	45	3
Applying Paint	845488	19	120	8
Preparing a Vehicle for Delivery	845496	20	90	6
Practicum in the Workplace	845506	21	90	6



Part I

Program Goals

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Program Goals

The *Auto Bodywork* program prepares students to practise the trade of auto body worker.

Auto body workers work in the automobile and heavy vehicle sectors: body shops, dealerships, repair centres, etc.

They inspect damage on vehicles, replace glass, repair and replace panels (doors, hoods, etc.), repair plastic parts, hammer out dents, straighten and repair frames, apply primer and paint to vehicles and prepare vehicles for delivery.

Auto body workers also replace safety and driver assistance components such as airbags and sensors.

Among other things, auto body workers use diagnostic tools; measuring instruments; hand, electrical, pneumatic and hydraulic tools; frame straightening, lifting, heating, cutting, welding and bonding equipment; and spray guns for primer and paint.

They must have excellent observation skills, as well as manual dexterity and meticulousness.

The program goals of the *Auto Bodywork* program are based on the general goals of vocational training. These goals are as follows:

- To help students develop effectiveness in the practice of a trade or occupation, that is:
  - to teach students to perform roles, functions, tasks and activities associated with the trade or occupation upon entry into the job market
  - to prepare students to progress satisfactorily on the job (which implies having the technical and technological knowledge and skills in such areas as communication, problem solving, decision making, ethics, health and safety)
- To help students integrate into the work force, that is:
  - to familiarize students with the job market in general and with the specific context of their chosen trade or occupation
  - to familiarize students with their rights and responsibilities as workers
- To foster students' personal development and acquisition of occupational knowledge, skills, perceptions and attitudes, that is:
  - to help students develop their autonomy and ability to learn and acquire effective work methods
  - to help students understand the principles underlying the techniques and the technology used in the trade or occupation
  - to help students develop self-expression, creativity, initiative and entrepreneurial spirit
  - to help students adopt the attitudes required to successfully practise the trade or occupation, and instill in them a sense of responsibility and a concern for excellence
- To promote job mobility, that is:
  - to help students develop positive attitudes toward change
  - to help students develop the means to manage their careers by familiarizing them with entrepreneurship

Educational Aims

The aim of the *Auto Bodywork* program is to help students develop attitudes and behaviours that representatives from education and the field deem essential to the practice of the trade:

- Foster the development of teamwork skills.
- Foster the development of attentiveness, precision and meticulousness.
- Develop a sense of pride in a job well done.
- Develop an open mind with respect to technological change.

Statements of the Competencies

List of Competencies

- Determined their suitability for the trade and the training process.
- Prevent occupational health and safety and environmental risks.
- Do shop work.
- Analyze vehicle damage.
- Replace removable body panels and related elements.
- Perform heating, cutting and welding tasks.
- Repair thermoplastic and composite components.
- Fabricate and install replacement parts.
- Test electrical and electronic systems.
- Test electronic control systems.
- Replace glass and related elements.
- Repair electrical, safety and driver assistance systems.
- Remove and install mechanical systems in a vehicle.
- Repair vehicle frames and chassis.
- Replace fixed body panels and related elements.
- Repair body panels.
- Apply primer on body panels.
- Match colours.
- Paint body panels.
- Prepare a vehicle for delivery.
- Enter the work force.

Grid of Competencies

The grid of competencies shows the relationship between general competencies, which correspond to work-related activities, and specific competencies, which are required to practise the particular trade or occupation, as well as the major steps in the work process.

The general competencies appear on the horizontal axis and the specific competencies, on the vertical axis. The symbol (○) indicates a correlation between a general and a specific competency. The symbol (∆) indicates a correlation between a specific competency and a step in the work process. Shaded symbols indicate that these relationships have been taken into account in the acquisition of specific competencies. 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 presents the specific competencies in the order in which they should be acquired and serves as a point of departure for determining how all the competencies will be taught.

GRID OF COMPETENCIES

AUTO BODYWORK	Competency no.	Type of competency	Hours	GENERAL COMPETENCIES								PROCESSES						TOTAL
				Determine their suitability for the trade and the training process	Prevent occupational health and safety and environmental risks	Do shop work	Analyze vehicle damage	Perform heating, cutting and welding tasks	Test electrical and electronic systems	Test electronic control systems	Match colours	Gather information about the job	Disassemble body parts	Repair or replace parts	Spray primer, paint and varnish	Reassemble body parts	Finish the work	
Competency no.				1	2	3	4	6	9	10	18							
Type of competency				S	B	B	B	B	B	B	B							
Hours				15	30	60	60	90	90	60	45							450
Replace removable body panels and related elements	5	B	45	○	●	●	●	○	○	○		▲	▲	▲		▲	▲	
Repair thermoplastic and composite components	7	B	60	○	●	●	●		○	○		▲	△	▲		△	▲	
Fabricate and install replacement parts	8	B	60	○	●	●	●	●				▲	△	▲		△	▲	
Replace glass and related elements	11	B	45	○	●	●	●		●	●		▲	▲	▲		▲	▲	
Repair electrical, safety and driver assistance systems	12	B	105	○	●	●	●		●	●		▲	▲	▲		▲	▲	
Remove and install mechanical systems in a vehicle	13	B	105	○	●	●	●	●	●	●		▲	△	△		△	▲	
Repair vehicle frames and chassis	14	B	120	○	●	●	●	●	○	○	○	▲	▲	▲	△	▲	▲	
Replace fixed body panels and related elements	15	B	120	○	●	●	●	●	○	○		▲	▲	▲		▲	▲	
Repair body panels	16	B	120	○	●	●	●	●	○	○		▲	▲	▲		△	▲	
Apply primer on body panels	17	B	120	○	●	●	●				○	▲			▲		▲	
Paint body panels	19	B	120	○	●	●	●				●	▲			▲		▲	
Prepare a vehicle for delivery	20	B	90	○	●	●	●		●	●		▲				▲	▲	
Enter the work force	21	S	90	●	●	○	○	○	○	○	○	△	△	△	△	△	△	
Duration of training			1 200															1 650

Links between the general competencies and the specific competencies

○: Existence of a link
●: Application of a link

Links between the work process and the specific competencies

△: Existence of a link
▲: Application of a link

Harmonization

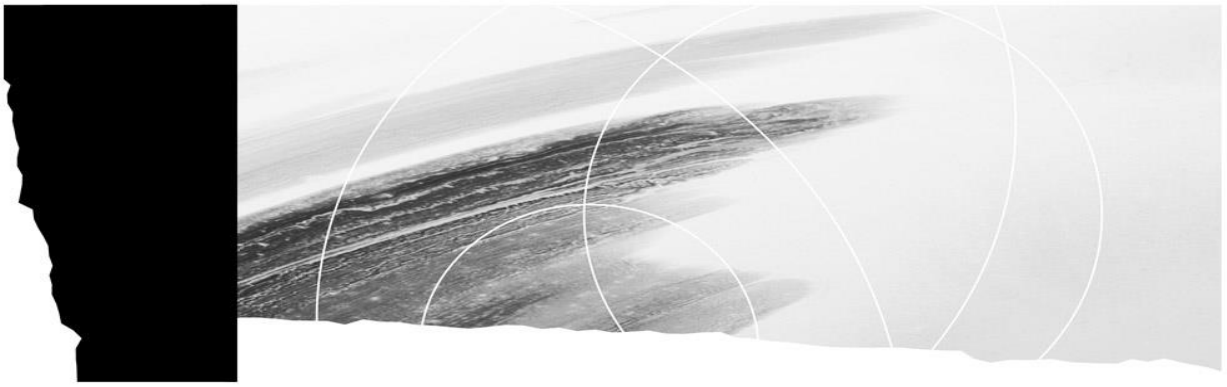
The Minister of Education harmonizes its vocational and technical programs by establishing similarities and continuity between secondary- and college-level programs within a particular sector or between sectors in order to avoid overlap in program offerings, to recognize prior learning and to optimize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

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

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

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

Harmonization of the *Auto Bodywork* program has resulted in identifying competencies that are shared with other programs. Detailed information on the harmonization of this program and its results is presented in the document entitled *Tableaux harmonisation Carrosserie.*



Part II

Program Competencies

Glossary

The Trade and the Training Process	Code: 845301

Competency 1 Duration 15 hours Credit 1

Situational Competency

Statement of the Competency

Determined their suitability for the trade and the training process.

Elements of the Competency

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

Learning Context

Information Phase

- Learning about the job market in auto bodywork.
- Learning about the nature and requirements of the trade.
- Learning about the training process.
- Sharing their initial reactions to the trade and the training process.

Participation Phase

- Presenting the information gathered from meetings with specialists and discussing their perception of the trade: advantages, disadvantages, requirements.
- Identifying the different characteristics of the training process (competencies, evaluation methods, certification of studies).
- Discussing the program of study as it relates to the trade.

Synthesis Phase

- Write a report in which they:
  - sum up their aptitudes and fields of interest
  - assess their career choice by comparing different aspects and requirements of the trade with their preferences, aptitudes and interests.

Instructional Guidelines

- Create a climate in which students can express themselves freely.
- Make the appropriate documentation available.
- Organize a meeting with trade specialists.
- Motivate students to participate in the proposed activities.
- Provide students with the means to assess their career choice objectively.

Participation Criteria

Information Phase

- Gather information on most of the topics to be covered.
- Present their views on the trade, making connections with the information gathered.

Participation Phase

- Participate actively in the activities organized.
- Adequately express their views on the program of study.
- Give their opinions on some requirements for practising the trade.

Synthesis Phase

- Write a report in which they:
  - sum up their aptitudes and fields of interest
  - explain their career choice, clearly making the required connections.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each phase of the learning context, along with their attendant guidelines.

Information Phase

- Characteristics of the job market: job prospects, working conditions, hiring criteria and remuneration, opportunities for promotion and transfer, etc.
- Nature and requirements of the trade: types of tasks, responsibilities, ethics, standards and regulations, etc.

Participation Phase

- Characteristics and requirements of the training process: program of study, evaluation, certification of studies, amount of work required, rules, student services, schedule, etc.
- Relationships between the program competencies and the tasks, operations, knowledge and skills associated with the trade.

Synthesis Phase

- Importance of assessing their career choice.
- Characteristics and qualities of a report confirming their career choice.

Health, Safety and Environmental Protection	Code: 845312

Competency 2 Duration 30 hours Credits 2

Behavioural Competency

Statement of the Competency

Prevent occupational health and safety and environmental risks.

Achievement Context

- Working with automobiles or on-road heavy vehicles.
- Using the necessary protective equipment.

Elements of the Competency	Performance Criteria
1. Take precautions to protect their health and safety and that of others.	• Recognition of dangerous situations in the work environment. • Determination of appropriate controls related to: – the layout of the shop – work methods – auto bodywork activities – the use of electric, pneumatic and hydraulic tools and equipment – load handling – product handling – the maintenance and storage of tools and equipment and workplace maintenance – the use of personal protective gear • Determination of appropriate fire prevention measures.
2. Take precautions to preserve the quality of the environment.	• Recognition of risk situations. • Determination of appropriate controls related to: – the use of toxic and hazardous products – the layout of the shop – the use of tools and equipment – the storage, disposal and recycling of hazardous materials – the preservation of air quality in the shop
3. Intervene in the case of an accident or emergency.	• Recognition of their limitations. • Relevant determination of an effective method of communicating with: – emergency services – resource people on site

For the competency as a whole:

- Adoption of safe behaviour in all circumstances.
- Use of appropriate terminology.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Take precautions to protect their health and safety and that of others.
   - Employers' and employees' rights and responsibilities.
   - Use of personal protective gear: shoes, safety glasses, ear protection, clothing, respiratory protective gear (full mask or hood), gloves, etc.
   - Importance of keeping the shop clean and organized.
   - Means of preventing falls or collisions with obstacles, avoiding overturning equipment, dropping tools, spilling hazardous products, etc.
   - Prevention methods associated with the use of electric, pneumatic and hydraulic tools and equipment.
   - Prevention methods associated with product handling (paints, primers, clear coat, resins, etc.): Workplace Hazardous Materials Information System (WHMIS), mask seal tests, local and overall ventilation, availability of emergency equipment (fire extinguishers, emergency showers, etc.).
   - Work methods.

2. Take precautions to preserve the quality of the environment.
   - Types of pollution.
   - Effects of chemicals on the environment.
   - Basic principles for preventing environmental pollution.
   - Use, storage and disposal of greases, oils and solvents.
   - Use of fuels, oxidizers and gases.
   - Presence of exhaust gas.
   - Laws and regulations respecting environmental protection (including against halocarbons).
   - Types of refrigerants; draining, recycling and charging procedures; disposal of gases and gas registry.

3. Intervene in the case of an accident or emergency.
   - Location of the first aid kit, fire extinguishers and fire protection equipment, water sources (decontamination shower, eyewash station, etc.), ventilation system control panel, etc.
   - Resources: medical personnel, paramedics, firefighters, police officers.

Shop Work	Code: 845324

Competency 3 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency

Do shop work.

Achievement Context

- Using lifting equipment: jack stands, jacks, engine hoist, automotive lift, chain block, etc.
- Using electric, pneumatic and hydraulic tools and equipment.
- Using cleaning and assembly products and lubricants.
- Using measuring instruments: ruler, tape measure, gauge, tram gauge, slide calliper.
- Using the necessary protective equipment.

Elements of the Competency	Performance Criteria
1. Lift and move loads.	• Appropriate choice of lifting equipment. • Appropriate use of fasteners. • Appropriate use of lifting equipment.
2. Disassemble and reassemble simple mechanical assemblies or body panels.	• Appropriate use of extractor. • Proper removal of components and fasteners. • Proper cleaning of components. • Proper reinstallation of components and fasteners.
3. Take measurements.	• Appropriate choice of measuring instruments. • Appropriate inspection of measuring instruments. • Appropriate use of measuring instruments. • Accurate conversion of units of measurement. • Accurate interpretation of measurements.
4. Do manual machining work.	• Appropriate use of cutting, drilling, grinding, filing, threading and tapping techniques. • Successful extraction of broken screws. • Proper installation of threaded inserts.
5. Finish the job.	• Proper cleaning of tools. • Proper maintenance of tools and equipment. • Appropriate storage of tools, measuring instruments, equipment and products. • Cleanliness of work area.

For the competency as a whole:

- Appropriate choice and use of tools, measuring instruments, equipment and products.
- Compliance with occupational health and safety rules.
- Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Lift and move loads.
   - Estimation of the load's weight and centre of gravity.
   - Identification of lifting points based on the type of vehicle or equipment.
   - Safe lifting of vehicles and movement of loads.
   - Safe use of jack stands, jacks, hoists, automotive lifts, chain block, etc.

2. Disassemble and reassemble simple mechanical assemblies or body panels.
   - Simple mechanical assemblies: wheels, hinges, fenders, etc.
   - Types of extractors: fork extractors, claw extractors.
   - Hand tools and electric, pneumatic and hydraulic equipment: wrenches, sockets, files, hammers, pliers, punches, screwdrivers, impact wrenches, torque wrenches, pneumatic ratchet wrenches, pneumatic hammers, etc.
   - Choice of cleaning products, cleaning method, pressure washer, etc.
   - Fasteners: pins, rivets, clips, bolts, screws, etc.

3. Take measurements.
   - Types of measuring instruments: ruler, tape measure, tram gauge, etc.
   - Choice of instrument based on type of measurement.
   - Inspection and use of measuring instruments: precautions and measurement points.
   - Meaning of measurements and conversion of metric and Imperial units.

4. Do manual machining work.
   - Inspection of tools and safety devices.
   - Preparation of tools: adjusting guards; changing grinding wheels, cutting wheels, wire brushes, etc.
   - Choice of drill bits.
   - Bench work using vices, files, saws, grinders, dies, taps, drills, etc.
   - Types of extractors (conical extractors, left-hand spiral extractors, etc.) and use (position and drilling of bolt in centre).
   - Threaded insert: choice of thread and installation equipment, choice of insertion technique based on the type of thread and the thread extraction technique.

5. Finish the job.
    - Tool and equipment maintenance: inspection, lubrication, etc.
    - Importance of a clean work area and proper storage of tools, measuring instruments, lifting and other equipment and products.

Analyzing Vehicle Damage	Code: 845334

Competency 4 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	**Achievement Context**
Analyze vehicle damage.	• Working with automobiles or on-road heavy vehicles. • Given an estimate or a work order. • Using technical documentation. • Using diagnostic, repair and estimation software. • In English and French.
Elements of the Competency	**Performance Criteria**
1. Read the estimate or work order.	• Accurate interpretation of information regarding the cost of materials. • Accurate interpretation of information regarding repair time.
2. Inspect the vehicle.	• Accurate reading of serial number. • Complete visual inspection of vehicle. • Appropriate recognition of the characteristics of the frame, body and passenger compartment. • Appropriate recognition of assembly methods. • Appropriate recognition of the main systems and components. • Identification of all visible damage.
3. Gather information about repair procedures and specifications.	• Appropriate determination of type of information required. • Determination of relevant reference materials. • Efficient location of required information.
4. Convey the information.	• Clear description of the work to be done. • Appropriate use of English and French terminology.
	For the competency as a whole: • Appropriate use of diagnostic, repair and estimation software. • Compliance with occupational health and safety rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Read the estimate or work order.
   - Distinction between estimate and work order.
   - Cost of materials: parts, paint, etc.
   - Repair times: standard and estimated.

2. Inspect the vehicle.
   - Data on vehicles and composition of serial number.
   - Types of frames: body on frame, unitized body.
   - Structural and non-structural components.
   - Types of bodies: sedan, convertible, limousine, SUV, minivan, truck, etc.
   - Types of passenger compartments: two-seater, four-seater or more, isolated cab, passenger transport, etc.
   - Removable and fixed panels.
   - Permanent fastening methods (welding, bonding, rivets, etc.) and temporary fastening methods (screws, clips, etc.).
   - Frame, body and passenger compartment materials: aluminum, steel, alloys, thermoplastics, composites, textiles, etc.
   - Main vehicle systems and components: braking, steering, suspension, electrical and electronic systems, engines, cooling, heating and air conditioning systems, etc.
   - Primary and secondary damage.

3. Gather information about repair procedures and specifications.
   - Location of information: table of contents, sections and subsections, alphabetical and numerical. order, special sections, etc.
   - Use of search engines, keyword searches, etc.

4. Convey the information.
   - Interpersonal and soft skills in a body shop.
   - English and French technical terminology and important words.

Replacing Removable Body Panels and Related Elements	Code: 845343

Competency 5 Duration 45 hours Credits 3

Behavioural Competency

Statement of the Competency	**Achievement Context**
Replace removable body panels and related elements.	• Working with automobiles or on-road heavy vehicles. • Working with removable panels such as doors, fenders, hoods, bumpers and tailgates. • Given an estimate or a work order. • Using technical documentation. • Using the necessary tools and lifting and other equipment. • Using replacement components. • Using cleaning, assembly and lubricating products.

Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of repair procedures and specifications. • Appropriate determination of sequence of operations. • Proper installation of protective elements.
2. Disassemble the parts.	• Removal of all trim. • Proper disconnection of electrical and electronic components. • Proper removal of related elements. • Proper removal of panel.
3. Replace the damaged body panel and related elements and reassemble.	• Appropriate choice of replacement panel and related elements. • Proper fastening and adjustment of panel. • Proper fastening of related elements. • Proper reconnection of electrical and electronic components.
4. Inspect the work.	• Thorough inspection. • Appropriate inspection of mechanical devices. • Relevant corrections made.

5. Finish the job.	• Proper installation of trim. • Removal of all protective elements. • Complete cleaning of surfaces. • Clear and complete indication of all the work done. • Appropriate storage of tools, lifting and other equipment and products. • Cleanliness of work area.
	For the competency as a whole:
	• Appropriate choice and use of tools, lifting and other equipment and products. • Compliance with repair procedures and specifications. • Compliance with the requirements set out in the estimate or work order. • Respect for the condition of the vehicle. • Compliance with occupational health and safety rules. • Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Types of removable panels: doors, fenders, hood, bumpers, tailgate, etc.
   - Installation of removable panels depending on the model of the vehicle.
   - Materials: steel, aluminum, thermoplastics, composites.
   - Interpretation of estimate or work order (see Competency 4).
   - Specific repair procedures and specifications and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Use of protective elements: covers, carpet protectors, etc.

2. Disassemble the parts.
   - Removal of trim based on the type of damage.
   - Disconnection of electrical and electronic components based on the type of damage.
   - Removal of related elements based on the type of damage.
   - Removal of panel.

3. Replace the damaged body panel and related elements and reassemble.
   - Choice of panel and related elements based on the type of damage.
   - Fastening and adjustment of panel: screws, clips, bolts, etc.
   - Fastening of related elements.
   - Reconnection of electrical and electronic components.

4. Inspect the work.
    - Inspection of work: uniform gaps between panels, weather seals, etc.
    - Inspection of mechanical devices: handles, hood striker, etc.

5. Finish the job.
    - Reinstallation of trim.
    - Removal of protective elements: covers, carpet protectors, etc.
    - Cleaning of painted surfaces, glass and trim.
    - Information: work done, time, difficulties encountered, decisions made, etc.
    - Importance of a clean work area and proper storage of tools, lifting and other equipment and products.

Heating, Cutting and Welding	Code: 845356

Competency 6 Duration 90 hours Credits 6

Behavioural Competency

Statement of the Competency	**Achievement Context**
Perform heating, cutting and welding tasks.	• On steel and aluminum. • Using heating, cutting and welding tools and equipment and the necessary protective gear. • Using degreasers, welding primers, etc.

Elements of the Competency	**Performance Criteria**
1. Prepare the work.	• Proper preparation of equipment. • Proper installation of metals and protective elements. • Appropriate use of surge protector.
2. Heat parts.	• Appropriate use of heating techniques. • Uniform heating.
3. Cut metals.	• Appropriate use of cutting techniques. • Clean cuts.
4. Weld metals.	• Proper preparation of surface. • Uniformity and resistance of weld bead. • Penetration of filler metal in accordance with requirements. • Meticulous finishing of surface.
5. Finish the job.	• Proper disassembly of equipment. • Appropriate storage of tools, equipment and products. • Cleanliness of work area.
	For the competency as a whole: • Proper identification of metal. • Appropriate choice and use of tools, equipment and products. • Compliance with occupational health and safety rules. • Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Prepare the work.
   - Preparation of equipment.
   - Installation and holding of metal.
   - Protective equipment, ventilation of work area, screens, gloves, safety glasses, etc.
   - Application of protections for electronic components and use of surge protector.

2. Heat parts.
   - Specific characteristics of induction heating or oxyacetylene (OAW) equipment.
   - Use of equipment and choice of techniques based on the type of metal and the components to be broken free or disassembled.

3. Cut metals.
   - Specific characteristics of equipment (OAW or plasma welding).
   - Use of equipment and choice of techniques based on the type of metal to be cut.

4. Weld metals.
   - Specific characteristics of gas shielded metal arc welding (pulsed GMAW) equipment and resistance welding machines.
   - Use of equipment and choice of techniques based on the type of metal, the welding process, the type of repair and the forces exerted on the part.
   - Preparation of metal: degreasing, grinding, welding primer, use of proper brushes for aluminum, etc.
   - Difficulties and specific characteristics of welding positions.
   - Use of welding torch (GMAW): tacking techniques and production of weld beads.
   - Weld bead defects: lack of penetration, porosity, irregular joints, gas entrapment, etc.

5. Finish the job.
   - Disassemble the equipment.
   - Importance of a clean work area and proper storage of tools, equipment and products.

Repairing Plastic Components	Code: 845364

Competency 7 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	Achievement Context
Repair thermoplastic and composite components.	• Working with automobiles or on-road heavy vehicles. • Given an estimate or a work order. • Using technical documentation. • Using the necessary tools and equipment. • Using a thermoplastic welding machine. • Using cleaning products. • Using reinforcements, adhesives, thermoplastic rods, body filler, sandpaper, etc.

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate identification of type of material. • Accurate interpretation of repair procedures and specifications. • Appropriate determination of sequence of operations.
2. Prepare the components.	• Appropriate choice and use of cleaning products. • Proper alignment of surfaces. • Proper bevelling techniques.
3. Do the repairs.	• Appropriate choice of reinforcements, adhesives or thermoplastic rods. • Proper positioning of reinforcements. • Proper thermoplastic welding or bonding techniques. • Proper bonding of composite material. • Adequate sanding of excess.
4. Apply the body filler.	• Adequate preparation of surface. • Adequate mixing of body filler. • Precise application of body filler. • Precise sanding of surface. • Uniformity of surface.
5. Finish the job.	• Clear and complete indication of all the work done. • Appropriate storage of tools, equipment and products. • Cleanliness of work area.

For the competency as a whole:

- Appropriate choice and use of tools, equipment and products.
- Compliance with repair procedures and specifications.
- Compliance with the requirements of the estimate or work order.
- Compliance with occupational health and safety rules.
- Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Composite materials: plastics reinforced with fibreglass and carbon fibre.
   - Interpretation of estimate or work order (see Competency 4).
   - Specific repair procedures and specifications and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.

2. Prepare the components.
   - Cleaning of surfaces.
   - Cold or hot alignment of surfaces.
   - Bevelling of edges.

3. Do the repairs.
   - Types of reinforcements: membrane, mesh, etc.
   - Types of adhesives for thermoplastics and composite materials and rigidity of parts.
   - Thermoplastic rods: polypropylene (PP), polyethylene (PE), terpolymer (ABS), etc.
   - Application of adhesion promoter to the thermoplastic to be bonded.
   - Thermoplastic welding and use of nitrogen welder.

4. Apply the body filler.
   - Types of putties: universal, flexible, fibreglass, finishing, etc.
   - Preparation of surface: featheredging, sanding, cleaning, etc.
   - Body filler mix ratio and quantity to prepare.
   - Application of body filler in layers and hardening time.
   - Sanding techniques: choice of sandpaper grit, sanding block, pneumatic sander, orbital sander, etc.

5. Finish the job.
    - Information: work done, time, difficulties encountered, decisions made, etc.
    - Importance of a clean work area and proper storage of tools, equipment and products.

Fabricating and Installing Replacement Parts	Code: 845374

Competency 8 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	**Achievement Context**
Fabricate and install replacement parts.	• Working with automobiles or on-road heavy vehicles. • Given an estimate or a work order. • Using the necessary tools, equipment and measuring and tracing instruments. • Using cleaning products. • Using sheet metal, adhesives, rivets, body filler, sandpaper, etc.
Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Accurate interpretation of estimate or work order. • Thorough inspection of damaged area. • Appropriate determination of sequence of operations. • Proper installation of protective devices.
2. Make a template for the part to be fabricated.	• Precise tracing of pattern. • Appropriate use of measuring and tracing instruments.
3. Reproduce the part.	• Precise marking out of sheet metal. • Precise cutting of sheet metal. • Precise forming and finishing.
4. Install the part.	• Proper removal of damaged part. • Adequate preparation of edges. • Precise fastening of part by welding, bonding or mechanical assembly.
5. Apply the body filler.	• Adequate preparation of surface. • Adequate mixing of body filler. • Precise application of body filler. • Precise sanding of surface. • Uniformity of surface.
6. Finish the job.	• Clear and complete indication of all the work done. • Appropriate storage of tools, equipment, measuring and tracing instruments and products. • Cleanliness of work area.

For the competency as a whole:

- Appropriate choice and use of tools, equipment, measuring and tracing instruments, and products.
- Compliance with the requirements of the estimate or work order.
- Respect for the condition of the vehicle.
- Compliance with occupational health and safety rules.
- Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Materials: steel and aluminum.
   - Interpretation of estimate or work order (see Competency 4).
   - Specific repair procedures and specifications, and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Use of protective elements: covers, carpet protectors, etc.

2. Make a template for the part to be fabricated.
   - Creation of patterns: measuring and tracing instruments, paper, cardboard, pencils, etc.

3. Reproduce the part.
   - Tracing, positioning and cutting of sheet metal (see Competencies 3 and 6).
   - Use of forming and finishing equipment: aviation snips, bulldog tin snips, sheet metal brake, hammers, anvils, dollies, files, etc.
   - Forming: bending, shrinking, stretching.
   - Finishing: filing, deburring, planishing.

4. Install the part.
   - Removal: cutting out of damaged part (automobile) or removal of damaged part (on-road heavy vehicle).
   - Edge preparation by sanding or grinding.
   - Welding of part and use of surge protector (see Competency 6).
   - Bonding of part: adhesives for steel and aluminum.
   - Mechanical assembly of part and use of rivets.

5. Apply the body filler.
   - Types of body filler: universal, metal, finishing, aluminum-based, etc.
   - Preparation of surface: featheredging, sanding, cleaning, etc.
   - Body filler mix ratio and quantity to prepare.

- Application of body filler in layers and hardening time.
- Sanding techniques: choice of sandpaper grit, sanding block, pneumatic sander, orbital sander, etc.

6. Finish the job.
   - Information: work done, time, difficulties encountered, decisions made, etc.
   - Importance of a clean work area and proper storage of tools, measuring and tracing instruments, equipment and products.

Testing Electrical and Electronic Systems	Code: 845386

Competency 9 Duration 90 hours Credits 6

Behavioural Competency

Statement of the Competency	**Achievement Context**
Test electrical and electronic systems.	• Working on automobiles. • Given a work order. • Using tools and measuring instruments and devices. • Using technical documentation. • Using the necessary protective equipment.

Elements of the Competency	**Performance Criteria**
1. Gather technical information on electrical and electronic systems.	• Selection of relevant information. • Accurate interpretation of drawings and diagrams, and the annotations, symbols and codes they contain. • Accurate interpretation of manufacturer's recommendations and specifications.
2. Plan the tests.	• Accurate location of components. • Appropriate determination of measurements to be taken. • Determination of logical sequence of operations. • Appropriate choice of measuring instruments and devices.
3. Do quality control checks on electrical and electronic systems.	• Thorough visual inspection of circuits and components. • Appropriate use of measuring instruments and devices. • Accurate reading of amperage, voltage and resistance measurements.
4. Diagnose the electrical and electronic systems.	• Thorough validation of readings against specifications. • Relevance of observations.
5. Explain the diagnosis.	• Appropriate justification of observations. • Proposal of appropriate solutions to the problems identified.

For the competency as a whole:

- Compliance with the manufacturer's recommended diagnostic approach.
- Appropriate use of tools.
- Appropriate use of English and French terminology.
- Respect for the condition of the vehicle.
- Compliance with occupational health and safety rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Gather technical information on electrical and electronic systems.
   - Nature of electricity, sources of electricity and risks associated with battery explosions.
   - Series, parallel and series-parallel circuits.
   - Direct and alternating currents.
   - Conductors, semiconductors and insulators.
   - Ohm's law.
   - Electrical drawings and diagrams: methods of finding information, annotations, symbols and codes.
   - Components of a circuit: power source, protective device, electricity-consuming device, conductors, switch, etc.
   - Status of circuit: open, closed, short circuit, etc.
   - Conventional direction of positive or negative current, power supply and grounding.
   - Relation between the size of a conductor and amperage.

2. Plan the tests.
   - Choice of measurements to be taken based on the characteristics of the circuit and the problem detected.
   - Manufacturer's recommended sequence of operations.
   - Types of measuring instruments and devices: multimeter, induction clamp, test light, etc.
   - Choice of instrument or device based on the type of measurement to be taken, the electrical circuit and the component.

3. Do quality control checks on electrical and electronic systems.
   - Search for pulled-out or cut wires, corrosion (oxidation or rust), damaged sheathing, etc.
   - Operation of measuring instruments and devices, safety instructions, etc.
   - Use of flying leads.
   - Choice of measuring units.
   - Procedure to be followed, steps and measurement points.
   - Connection procedures based on the type of measurement to be taken.

4. Diagnose the electrical and electronic systems.
    - Interpretation of readings against manufacturer's specifications.
    - Diagnoses: normal functioning, open circuit, short circuit, parasitic resistance, defective electrical or electronic component.

5. Explain the diagnosis.
    - Observations and solutions.
    - English and French technical terminology.

Testing Electronic Control Systems	Code: 845394

Competency 10 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	**Achievement Context**
Test electronic control systems.	• Working on automobiles. • Given a work order. • Using tools. • Using testing and communication instruments and devices. • Using technical documentation. • Using the necessary protective equipment.

Elements of the Competency	**Performance Criteria**
1. Gather the information needed to test the systems.	• Selection of relevant information. • Accurate interpretation of: – manufacturer's recommendations – drawings, diagrams and graphs
2. Plan the test.	• Appropriate determination of tests to be done on: – sensors – electrical and electronic circuits – electronic modules – actuators • Appropriate choice of testing and communications instruments and devices.
3. Test sensors.	• Accurate location of sensors. • Accurate reading of measurements: – voltages and resistances – types of signals generated – signal signature
4. Test electrical and electronic circuits.	• Accurate identification of type of circuit. • Accurate location of circuit to be tested. • Accurate reading of measurements: – voltages – amperages – resistance
5. Test electronic modules.	• Accurate location of module to be tested and its circuits. • Accurate reading of fault codes. • Methodical testing of input and output parameters.

6. Test actuators.	• Accurate location of system and its actuators. • Accurate reading of measurements: – voltages – amperages – resistance – signal signature
7. Make observations.	• Thorough validation of readings against manufacturer's specifications. • Relevance of observations.
8. Explain the diagnosis.	• Appropriate justification of observations. • Proposal of appropriate solutions to the problems identified.
	For the competency as a whole:
	• Thorough visual inspection of systems. • Appropriate use of tools. • Appropriate choice of testing and communications instruments and devices. • Proper application of protective measures associated with working on systems. • Appropriate use of tables of symptoms and diagnoses. • Cleanliness of work area. • Respect for the condition of the vehicle. • Compliance with occupational health and safety rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Gather the information needed to inspect the systems.
   - Drawings, diagrams and graphs: methods of finding information, annotations, symbols and codes.
   - Components of an electronic control circuit.
   - Specific characteristics of signals and waveforms.

2. Plan the test.
   - Choice of measurements to be taken based on the characteristics of the circuit.
   - Manufacturer's recommended sequence of operations.
   - Choice of instrument or device based on the type of measurement to be taken, the electrical. circuit and the electronic component: multimeter, oscilloscope, diagnostic tool, computer, etc.

3. Test sensors.
    - Types of sensors: camera, radar, magnetic, etc.
    - Location of sensors in vehicles: bumpers, windshield, rear-view mirror, etc.
    - Visual inspection: damaged sensor, damaged connector, etc.
    - Use of measuring instrument or device.
    - Voltage, amperage, resistance, etc.
    - Types of signals generated and signal signature.
4. Test electrical and electronic circuits.
    - Classification of the different types of circuits.
    - Wires, terminals and connectors.
    - Location of circuits and harnesses in vehicles.
    - Search for pulled-out or cut wires, corrosion (oxidation or rust), damaged sheathing, etc.
    - Use of measuring instrument or device.
    - Voltage, voltage drops, resistance and continuity.
5. Test electronic modules.
    - Main components of the computer and how they work.
    - Types of communication.
    - Location of electronic modules in vehicles.
    - Types of fault codes: system, problem, etc.
    - Use of measuring instrument or device.
    - Input and output parameters.
6. Test actuators.
    - Types of actuators: windshield wiper motor, power window motor, power door lock motor, etc.
    - Location of actuators in vehicles.
    - Visual inspection: damaged actuator, damaged connector, etc.
    - Use of measuring instrument or device.
    - Voltage, voltage drops, resistance, continuity, etc.
    - Types of signals generated and signal signature.
7. Make observations.
    - Interpretation of readings against manufacturer's specifications.
    - Diagnoses: normal functioning, short circuit, open circuit, parasitic resistance, defective component.
8. Explain the diagnosis.
    - Observations and solutions.
    - English and French technical terminology.

Replacing Glass and Related Elements	Code: 845403

Competency 11 Duration 45 hours Credits 3

Behavioural Competency

Statement of the Competency	**Achievement Context**
Replace glass and related elements.	• Working with automobiles or on-road heavy vehicles. • Working with structural and non-structural glass. • Given an estimate or a work order. • Using technical documentation. • Using the necessary tools, measuring instruments and equipment. • Using replacement components and adhesives. • Using cleaning, assembly and lubricating products.

Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of repair procedures and specifications. • Proper determination of sequence of operations. • Proper installation of protective devices.
2. Disassemble the parts.	• Removal of all trim. • Proper disconnection of electrical and electronic components. • Proper removal of related elements. • Proper removal of glass.
3. Replace the damaged glass and related elements and reassemble.	• Appropriate choice of replacement glass and related elements. • Proper installation of glass. • Proper installation of related elements. • Proper reconnection of electrical and electronic components.
4. Inspect the work.	• Thorough inspection. • Appropriate inspection of mechanical devices and electrical and electronic components. • Relevant corrections made.

5. Finish the job.	• Proper installation of trim. • Removal of all protective elements. • Complete cleaning of surfaces. • Clear and complete indication of all the work done. • Appropriate storage of tools, measuring instruments, equipment and products. • Cleanliness of work area. *For the competency as a whole:* • Appropriate choice and use of tools, lifting and other equipment, and products. • Compliance with repair procedures and specifications. • Compliance with the requirements of the estimate or work order. • Respect for the condition of the vehicle. • Compliance with occupational health and safety rules. • Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Types of glass: structural and non-structural.
   - Location of structural and non-structural glass in different vehicle models.
   - Cracked or broken glass.
   - Tinted glass.
   - Interpretation of estimate or work order (see Competency 4).
   - Specific repair procedures and specifications and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Use of protective elements: covers, carpet protectors, etc.

2. Disassemble the parts.
   - Removal of trim based on the type of damage.
   - Disconnection of electrical and electronic components based on the type of damage.
   - Removal of related elements based on the type of damage.
   - Removal and disposal or storage of glass.

3. Replace the damaged glass and related elements and reassemble.
    - Choice of replacement glass and related elements based on the type of damage.
    - Installation of glass using adhesive, recessing, clips, etc.
    - Installation of related elements.
    - Reconnection of electrical and electronic components.

4. Inspect the work.
    - Inspection of work: position, seal, burrs, etc.
    - Inspection of mechanical devices: sliding system for glass, operation of locks, etc.
    - Inspection of electrical and electronic components (see Competencies 9 and 10).

5. Finish the job.
    - Reinstallation of trim.
    - Removal of protective elements: covers, carpet protectors, etc.
    - Cleaning of painted surfaces, glass and trim.
    - Information: work done, time, difficulties encountered, decisions made, etc.
    - Importance of a clean work area and proper storage of tools, measuring instruments, equipment and products.

Repairing Electrical, Safety and Driver Assistance Systems	Code: 845417

Competency 12 Duration 105 hours Credits 7

Behavioural Competency

Statement of the Competency	Achievement Context
Repair electrical, safety and driver assistance systems.	• Working on automobiles. • Working on electrical, safety and driver assistance systems such as headlights, airbags, cameras, radar and safety belts. • Given an estimate or a work order. • Using technical documentation. • Using the necessary tools, measuring instruments and equipment. • Using replacement components. • Using cleaning, assembly and lubricating products.

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of repair procedures and specifications. • Proper determination of sequence of operations. • Proper installation of protective devices.
2. Disassemble the parts.	• Removal of all trim. • Proper disconnection of electrical and electronic components. • Proper removal of safety and driver assistance systems.
3. Replace or repair damaged components and reassemble.	• Appropriate choice of replacement components. • Proper replacement or repair of safety and driver assistance system components. • Proper reconnection of electrical and electronic components. • Precise adjustment of systems.
4. Inspect the work.	• Appropriate inspection of electrical and electronic components. • Relevant corrections made.
5. Finish the job.	• Proper installation of trim. • Removal of all protective elements. • Complete cleaning of surfaces.

- Clear and complete indication of all the work done.
- Appropriate storage of tools, measuring instruments, equipment and products.
- Cleanliness of work area.

For the competency as a whole:

- Appropriate choice and use of tools, measuring instruments, equipment and products.
- Accurate interpretation of fault codes.
- Compliance with repair procedures and specifications.
- Compliance with the requirements of the estimate or work order.
- Respect for the condition of the vehicle.
- Compliance with occupational health and safety rules.
- Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Working on safety and driver assistance systems: headlights, airbags, cameras, radar, safety belts, etc.
   - Location of safety and driver assistance systems depending on the model of vehicle.
   - Main problems: deployed airbags, damaged headlights, defective sensors, activated safety belt pre-tensioners, etc.
   - Interpretation of estimate or work order (see Competency 4).
   - Specific repair procedures and specifications and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Use of protective elements: covers, carpet protectors, wrist straps, etc.

2. Disassemble the parts.
   - Removal of trim based on the type of damage.
   - Disconnection of electrical and electronic components based on the type of damage.
   - Removal of safety and driver assistance systems based on the type of damage.

3. Replace or repair damaged components and reassemble.
    - Choice of replacement components based on type of damage.
    - Replacement of components of electrical, safety and driver assistance systems based on the type of damage.
    - Repair of components: cut wires, connectors, etc.
    - Reconnection of electrical and electronic components.
    - Adjustment of systems: alignment of headlights, cameras or radar, reinitialization of systems, etc.

4. Inspect the work.
    - Inspection of electrical and electronic components (see Competencies 9 and 10).

5. Finish the job.
    - Reinstallation of trim.
    - Removal of protective elements: covers, carpet protectors, etc.
    - Cleaning of painted surfaces, glass and trim.
    - Information: work done, time, difficulties encountered, decisions made, etc.
    - Importance of a clean work area and proper storage of tools, measuring instruments, equipment and products.

Removing and Installing Mechanical Systems	Code: 845427

Competency 13 Duration 105 hours Credits 7

Behavioural Competency

Statement of the Competency

Remove and install mechanical systems in a vehicle.

Achievement Context

- Working on automobiles.
- Working on conventional and alternative drive systems.
- Given an estimate or a work order.
- Using technical documentation.
- Using the necessary tools, measuring instruments and lifting and other equipment.
- Using an air conditioning maintenance station, a gas identifying device, a tire machine and a tire balancer.
- Using cleaning and assembly products, sealants and lubricants.

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of technical documentation. • Proper determination of sequence of operations. • Proper installation of protective devices.
2. Disassemble road handling and drive systems.	• Proper application of the necessary heating techniques. • Proper removal of road handling and drive system components. • Proper removal of tires. • Proper cleaning of road handling and drive system components. • Accurate identification of road handling and drive system components.
3. Disassemble cooling and air conditioning systems.	• Proper recovery of refrigerant and fluids. • Proper removal of cooling and air conditioning system components. • Proper cleaning of cooling and air conditioning system components. • Accurate identification of cooling and air conditioning system components.

4. Reassemble road handling and drive systems.	• Proper installation of road handling and drive system components. • Proper mounting of tires and balancing of wheels. • Compliance with assembly sequences for road handling and drive systems.
5. Reassemble cooling and air conditioning systems.	• Proper installation of cooling and air conditioning system components. • Compliance with assembly sequences for cooling and air conditioning systems. • Appropriate inspection for cooling and air conditioning system leaks. • Proper filling of cooling and air conditioning systems.
6. Test the systems.	• Proper application of starting and test procedures. • Complete visual inspection. • Appropriate inspection of mechanical devices and electrical and electronic components. • Proper performance testing of air conditioning system. • Relevant corrections made.
7. Finish the job.	• Removal of all protective elements. • Complete cleaning of surfaces. • Clear and complete indication of all the work done. • Proper storage of tools, measuring instruments, lifting and other equipment and products. • Cleanliness of work area.
	For the competency as a whole: • Appropriate choice and use of tools, measuring instruments, lifting and other equipment and products. • Compliance with the requirements of the estimate or work order. • Compliance with procedures for disconnecting and reconnecting electrical and electronic components. • Compliance of recommended methods and specifications. • Respect for the condition of the vehicle. • Compliance with occupational health and safety rules. • Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.

   - Road handling system: steering, suspension and braking system.
   - Drive system: front-wheel, rear-wheel and all-wheel drive.
   - Liquid cooling systems.
   - Air conditioning systems: compressor, evaporator, condenser, etc.
   - Regulations respecting halocarbons (see Competency 2).
   - Interpretation of estimate or work order (see Competency 4).
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Use of protective elements: covers, carpet protectors, etc.

2. Disassemble road handling and drive systems.

   - Application of heating techniques (see Competency 6).
   - Disassembly of road handling and drive systems and recommended sequences.
   - Original position of components.
   - Use of tire machine to remove tires.
   - Cleaning and identification of components.

3. Disassemble cooling and air conditioning systems.

   - Removal of cooling system components and recommended sequences.
   - Removal of air conditioning system components.
   - Operation of air conditioning maintenance station: recovery, recycling, vacuum, filling and oil injection.
   - Operation of gas identifying device: types of gases, presence of contamination.
   - Preparation of air conditioning maintenance station, machine and connection specifications.
   - Original position of components.
   - Cleaning and identification of components.

4. Reassemble road handling and drive systems.

   - Reassembly of road handling and drive systems: assembly sequences and manufacturer's recommended methods and specifications for tolerances, adjustments, torque and component tightening sequences.
   - Sealants, lubricants and assembly products: oils, greases, sealants, thread-locking fluids.
   - Use of tire and balancing machines.
   - Tightening sequence and torque of wheel nuts.

5. Reassemble cooling and air conditioning systems.

   - Reassembly of cooling and air conditioning systems: assembly sequences and manufacturer's recommended methods and specifications for tolerances, adjustments, torque and component tightening sequences.
   - Use of air conditioning maintenance station (see above).
   - Operation of leak detector and use of nitrogen.

- Compatibility of oils and refrigerant.
- Application of vacuum, oil injection and filling procedure.
- Sealants, lubricants and assembly products: oils, greases, sealants, thread-locking fluids.

6. Test the systems.
   - Inspection of the various systems and mechanical devices.
   - Inspection of electrical and electronic components (see Competencies 9 and 10).
   - Performance test: evaporation, condensation and vaporization processes.
   - Pressurization, temperature and state of a gas, verification of passenger compartment temperature, system pressures and manufacturer's specifications.

7. Finish the job.
   - Removal of protective elements: covers, carpet protectors, etc.
   - Cleaning of painted surfaces, glass and trim.
   - Information: work done, time, difficulties encountered, decisions made, etc.
   - Importance of a clean work area and proper storage of tools, measuring instruments, lifting and other equipment and products.

Straightening and Repairing Frames	Code: 845438

Competency 14 Duration 120 hours Credits 8

Behavioural Competency

Statement of the Competency	**Achievement Context**
Repair vehicle frames and chassis.	• Working on automobiles. • Given an estimate or a work order. • Using technical documentation. • Using the necessary tools, measuring instruments and lifting and other equipment. • Using a chassis jig, straightening bench or measurement system. • Using replacement components, mechanical fasteners, adhesives, weld through primer, etc. • Using cleaning products and seam sealers.

Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of repair procedures and specifications. • Proper determination of sequence of operations. • Proper installation of protective devices.
2. Disassemble the parts.	• Removal of all trim. • Proper disconnection of electrical and electronic components. • Proper removal of related elements.
3. Prepare for straightening.	• Proper installation of vehicle on chassis jig or straightening bench. • Proper adjustment of chassis jig or proper calibration of measurement system.
4. Measure and straighten the vehicle's chassis or frame.	• Appropriate choice of measurement points. • Appropriate determination of components to be straightened. • Appropriate choice and use of straightening tools. • Accurate adjustment of heights, widths and lengths.
5. Replace damaged components and reassemble.	• Complete cleaning of surfaces. • Proper removal of component by cutting, drilling or grinding.

	• Appropriate choice of replacement components. • Precise fastening of components by welding, bonding or mechanical assembly. • Proper reconnection of electrical and electronic components.
6. Finish the job.	• Clear and complete indication of all the work done. • Proper storage of tools, measuring instruments, lifting and other equipment and products. • Cleanliness of work area.
	For the competency as a whole:
	• Appropriate choice and use of tools, measuring instruments, lifting and other equipment and products. • Compliance with repair procedures and specifications. • Proper application of the necessary heating techniques. • Compliance with the requirements of the estimate or work order. • Respect for the condition of the vehicle. • Compliance with occupational health and safety rules. • Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Types of frames: body on frame, unitized body.
   - Materials: steel, aluminum and composites.
   - Interpretation of estimate or work order (see Competency 4).
   - Specific repair procedures and specifications and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Use of protective elements: covers, carpet protectors, etc.

2. Disassemble the parts.
   - Removal of trim based on the type of damage.
   - Disconnection of electrical and electronic components based on the type of damage.
   - Removal of related elements based on the type of damage.

3. Prepare for straightening.
    - Installation of vehicle on chassis jig or straightening bench: positioning, use of clamps, protective pads for aluminum, etc.
    - Adjustment of chassis jig: height, width and length of reference points.
    - Calibration of measurement systems: use of computer system and measurement of reference points in the undamaged area.

4. Measure and straighten the vehicle's frame.
    - Choice of measurement points based on the type of damage.
    - Determination of components to be straightened based on the type of damage: longitudinal side member, shock tower, B-pillar, etc.
    - Straightening tools: chassis jig, straightening bench, hooks, clamps, chains, etc.

5. Replace damaged components and reassemble.
    - Removal of component by cutting, drilling or grinding.
    - Choice of replacement components based on type of damage.
    - Welding of part and use of surge protector (see Competency 6).
    - Bonding of components: adhesives for steel or aluminum.
    - Mechanical assembly of components: screws, clips, rivets, etc.
    - Fastening of related elements.
    - Reconnection of electrical and electronic components.

6. Finish the job.
    - Information: work done, time, difficulties encountered, decisions made, etc.
    - Importance of a clean work area and proper storage of tools, measuring instruments, lifting and other equipment and products.

Replacing Fixed Body Panels and Related Elements	Code: 845448

Competency 15 Duration 120 hours Credits 8

Behavioural Competency

Statement of the Competency	Achievement Context
Replace fixed body panels and related elements.	• Working with automobiles or on-road heavy vehicles. • Working with fixed panels such as door skins, fenders, quarter panels and roofs. • Given an estimate or a work order. • Using technical documentation. • Using the necessary tools and lifting and other equipment. • Using replacement components, adhesives, rivets, body filler, sandpaper, etc. • Using lubricants.

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of repair procedures and specifications. • Proper determination of sequence of operations. • Proper installation of protective devices.
2. Disassemble the parts.	• Removal of all trim. • Proper disconnection of electrical and electronic components. • Proper removal of related elements. • Proper removal of panel by cutting, drilling or grinding.
3. Replace the damaged body panel and related elements and reassemble.	• Appropriate choice of replacement panel and related elements. • Precise fastening of panel by welding, bonding or mechanical assembly. • Proper fastening of related elements. • Proper reconnection of electrical and electronic components.
4. Apply the body filler.	• Adequate preparation of surface. • Adequate mixing of body filler. • Precise application of body filler. • Precise sanding of surface. • Uniformity of surface.

5. Finish the job.	• Clear and complete indication of all the work done. • Appropriate storage of tools, lifting and other equipment and products. • Cleanliness of work area. *For the competency as a whole:* • Appropriate choice and use of tools, lifting and other equipment and products. • Compliance with repair procedures and specifications. • Compliance with the requirements of the estimate or work order. • Respect for the condition of the vehicle. • Compliance with occupational health and safety rules. • Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Working with fixed panels: door skins, fenders, side panels, roofs, etc.
   - Materials: steel, aluminum, composites.
   - Interpretation of estimate or work order (see Competency 4).
   - Specific repair procedures and specifications and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Use of protective elements: covers, carpet protectors, etc.

2. Disassemble the parts.
   - Removal of trim based on the type of damage.
   - Disconnection of electrical and electronic components based on the type of damage.
   - Removal of related elements based on the type of damage.
   - Removal of panel and cutting, drilling or grinding (see Competencies 3 and 6).

3. Replace the damaged body panel and related elements and reassemble.
   - Choice of replacement panel and related elements.
   - Welding of part and use of surge protector (see Competency 6).
   - Bonding of panel: adhesives for steel, aluminum and composites.
   - Mechanical assembly of panel and use of rivets.
   - Fastening of related elements.
   - Reconnection of electrical and electronic components.

4. Apply the body filler.
    - Types of body filler: universal, metal, finishing, aluminum-based, etc.
    - Preparation of surface: featheredging, sanding, cleaning, etc.
    - Body filler mix ratio and quantity to prepare.
    - Application of body filler in layers and hardening time.
    - Sanding techniques: choice of sandpaper grit, sanding block, pneumatic sander, orbital sander, etc.

5. Finish the job.
    - Information: work done, time, difficulties encountered, decisions made, etc.
    - Importance of a clean work area and proper storage of tools, lifting and other equipment and products.

Repairing Dents and Body Panels	Code: 845458

Competency 16 Duration 120 hours Credits 8

Behavioural Competency

Statement of the Competency	Achievement Context
Repair body panels.	• Working with automobiles or on-road heavy vehicles. • Given an estimate or a work order. • Using technical documentation. • Using the necessary tools and lifting and other equipment. • Using body filler and sandpaper. • Using cleaning products.

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of repair procedures and specifications. • Proper determination of sequence of operations. • Proper installation of protective devices.
2. Disassemble the parts.	• Removal of all trim. • Proper disconnection of electrical and electronic components. • Proper removal of related elements.
3. Remove dents from a panel.	• Accurate determination of damaged points or areas. • Adequate preparation of surface. • Appropriate choice and use of corrective measures.
4. Weld a torn panel.	• Adequate straightening of tear edges. • Proper welding.
5. Apply the body filler.	• Adequate preparation of surface. • Adequate mixing of body filler. • Precise application of body filler. • Precise sanding of surface. • Uniformity of surface.
6. Finish the job.	• Clear and complete indication of all the work done. • Appropriate storage of tools, lifting and other equipment and products. • Cleanliness of work area.

For the competency as a whole:

- Appropriate choice and use of tools, lifting and other equipment and products.
- Compliance with repair procedures and specifications.
- Compliance with the requirements of the estimate or work order.
- Respect for the condition of the vehicle.
- Compliance with occupational health and safety rules.
- Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Repair of dents and fixed and removable panels.
   - Materials: steel, aluminum.
   - Interpretation of estimate or work order (see Competency 4).
   - Specific repair procedures and specifications and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Use of protective elements: covers, carpet protectors, etc.

2. Disassemble the parts.
   - Removal of trim based on the type of damage.
   - Disconnection of electrical and electronic components based on the type of damage.
   - Removal of related elements based on the type of damage.

3. Remove dents from a panel.
   - Visual and tactile detection of damaged points or areas: dents, bumps, dimples, etc.
   - Grinding and sanding of surface.
   - Choice and use of corrective methods: hammer, rods, weld rivets or nails, stretching, shrinking, etc.

4. Weld a torn panel.
   - Straightening of tear edges using a hammer, dolly, etc.
   - Welding of part and use of surge protector (see Competency 6).

5. Apply the body filler.
   - Types of body filler: universal, metal, finishing, aluminum-based, etc.
   - Preparation of surface: featheredging, sanding, cleaning, etc.
   - Body filler mix ratio and quantity to prepare.
   - Application of body filler in layers and hardening time.
   - Sanding techniques: choice of sandpaper grit, sanding block, pneumatic sander, orbital sander, etc.

6. Finish the job.
   - Information: work done, time, difficulties encountered, decisions made, etc.
   - Importance of a clean work area and proper storage of tools, lifting and other equipment and products.

Applying Primer	Code: 845468

Competency 17 Duration 120 hours Credits 8

Behavioural Competency

Statement of the Competency

Apply primer on body panels.

Achievement Context

- Working with automobiles or on-road heavy vehicles.
- Working on steel, aluminum, thermoplastic or composite panels.
- Given an estimate or a work order.
- Using technical documentation.
- Using cleaning products and masking materials.
- Using different primers: self-etching primer, epoxy resin-based primer, surfacer, filler, etc.
- Using mixing room tools: scale, measuring sticks, graduated cups, etc.
- Using spraying equipment: protective equipment, guns, nozzles, supports, etc.

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of procedures and specifications for the application of products. • Proper determination of sequence of operations.
2. Prepare the surface.	• Appropriate choice and use of cleaning products. • Precise sanding of surface. • Precise masking of adjacent surfaces.
3. Prepare the spraying equipment.	• Appropriate inspection of spraying area and protective gear. • Appropriate choice of guns and nozzles.
4. Prepare the primers.	• Accurate calculation of quantities. • Proper mixing. • Compliance with requirements for working in a mixing room.

5. Apply the primers.	• Proper adjustment of gun. • Appropriate use of application technique on a complete or partial panel. • Compliance with application requirements. • Compliance with requirements for working in a spraying area.
6. Finish the job.	• Careful finishing sanding. • Removal of all masking materials. • Thorough cleaning of spraying equipment. • Clear and complete indication of all the work done. • Appropriate storage of tools, equipment and products. • Cleanliness of work area.
	For the competency as a whole: • Appropriate choice and use of tools, equipment and products. • Compliance with procedures and manufacturer's specifications. • Compliance with the requirements of the estimate or work order. • Respect for the condition of the vehicle. • Compliance with occupational health and safety rules. • Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Materials: steel, aluminum, thermoplastics, composites.
   - Interpretation of estimate or work order (see Competency 4).
   - Procedures and specifications for product application and manufacturer's requirements.
   - Determination of sequence of operations based on the type of damage, the manufacturer's requirements and the estimate or work order.
   - Determination of sequence of operations based on the number of panels, the surfaces to be primed and the estimate or work order.

2. Prepare the surface.
   - Use of appropriate degreasers.
   - Sanding techniques: choice of sandpaper grit, sanding block, pneumatic sander, orbital sander, etc.

- Masking using masking tape, polyethylene film, masking fluid, plugs, etc.
- Blowing of compressed air on panel.

3. Prepare the spraying equipment.
   - Inspection of spraying areas and compliance with occupational health and safety requirements: electrical safety, fresh air supply, evacuation of foul air, vapour control, etc.
   - Inspection of protective gear: full mask or hood, suit, gloves, etc.
   - Types of guns and nozzles used for primers.

4. Prepare the primers.
   - Types of primer : self-Erching primer, surfacer, filler, etc.
   - Composition of product: primer, catalyst and thinner.
   - Calculation of quantities based on the mix ratio and the surface to be covered.
   - Use of scale, measuring sticks, graduated cups, etc.
   - Requirements for working in a mixing room: preparation area, vapour control, ignition source control, etc.

5. Apply the primers.
   - Adjustment of gun: air pressure at input or output (air cap), spray width, etc.
   - Application on a complete and a partial panel: number of layers, drying time, etc.
   - Application requirements: overlap, distance between surface and gun, stroke speed, etc.

6. Finish the job.
   - Sanding techniques: choice of sandpaper grit, sanding block, pneumatic sander, orbital sander, etc.
   - Cleaning of spraying equipment: disassembly, washing with solvent, brushing, etc.
   - Information: work done, time, difficulties encountered, decisions made, etc.
   - Importance of a clean work area and proper storage of tools, equipment and products.

Colorimetry	Code: 845473

Competency 18 Duration 45 hours Credits 3

Behavioural Competency

Statement of the Competency	**Achievement Context**
Match colours.	• Working with automobiles or on-road heavy vehicles. • Given colour charts, a colour wheel, standard colours, etc. • Using a lighting kit and spectrophotometer.

Elements of the Competency	**Performance Criteria**
1. Prepare the surface.	• Adequate cleaning of surface. • Adequate polishing of surface.
2. Observe the colour of the vehicle.	• Accurate reading of paint code. • Methodical visual examination of the surface from different angles. • Appropriate use of lighting kit and spectrophotometer.
3. Determine the colour dimensions.	• Accurate interpretation of the influence of surrounding colours on visual perception. • Appropriate determination of hue. • Appropriate determination of colour saturation. • Appropriate determination of colour value.
	For the competency as a whole: • Appropriate use of colour charts. • Appropriate use of standard colours.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Prepare the surface.
   - Cleaning of surface using soap and water, or degreaser.
   - Polishing of surface using polishing paste.

2. Observe the colour of the vehicle.

   - Location of paint code depending on the manufacturer.
   - Visual examination of the surface from different angles: from the front and side, diagonally
   - Types of lighting, metamerism, etc.
   - Colour wheel.

   - Colour theory.
   - Colour composition.
   - Use of lighting kit and spectrophotometer.

3. Determine the colour dimensions.

   - Characteristics of different natural and artificial light sources.
   - Types of pigments: opaque, metallic, pearl, etc.
   - Colour shift.
   - Colour dimensions: hue, saturation and value.

Applying Paint	Code: 845488

Competency 19 Duration 120 hours Credits 8

Behavioural Competency

Statement of the Competency	Achievement Context
Paint body panels.	• Working with automobiles or on-road heavy vehicles. • Given an estimate or a work order. • Using technical documentation. • Using cleaning products and masking materials. • Using primer-sealers, paints and clear coats. • Using mixing room tools: scale, measuring sticks, graduated cups, etc. • Using spraying equipment: protective. equipment, guns, nozzles, supports, etc.

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of estimate or work order. • Accurate interpretation of procedures and specifications for the application of products. • Proper determination of sequence of operations.
2. Prepare the panels for paint.	• Appropriate choice and use of cleaning products. • Precise sanding of surface. • Precise masking of adjacent surfaces. • Adequate positioning of panels in the spraying area.
3. Prepare the spraying equipment.	• Appropriate inspection of spraying area and protective gear. • Appropriate choice of guns and nozzles.
4. Prepare the products: • primer-sealer • paint • clear coat	• Appropriate determination of colour variation. • Accurate calculation of quantities. • Precise mixture of products. • Compliance with requirements for working in a mixing chamber.
5. Adjust the colour.	• Careful painting of spray out cards. • Optimal colour matching.

6. Apply the products. • primer-sealer • paint • clear coat	• Mastery of application techniques on a complete or partial panel. • Compliance with application requirements. • Compliance with requirements for working in a spraying area.
7. Inspect the work.	• Meticulous inspection of surfaces. • Identification of all imperfections. • Proper sanding and polishing.
8. Finish the job.	• Removal of all masking materials. • Complete cleaning of spraying equipment. • Clear and complete indication of all the work done. • Appropriate storage of tools, equipment and products. • Cleanliness of work area.
	For the competency as a whole: • Appropriate choice and use of tools, equipment and products. • Proper adjustment of gun. • Compliance with procedures and manufacturer's specifications. • Compliance with the requirements of the estimate or work order. • Respect for the condition of the vehicle. • Compliance with occupational health and safety rules. • Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Interpretation of estimate or work order (see Competency 4).
   - Procedures and specifications for product application and manufacturer's requirements.
   - Determination of sequence of operations based on the number of panels, their orientation, the surfaces to be primed and the estimate or work order.

2. Prepare the panels for paint.
   - Use of specific degreasers for paint jobs.
   - Sanding techniques: choice of sandpaper grit, sanding block, pneumatic sander, orbital sander, etc.
   - Masking using masking tape, polyethylene film, masking fluid, sticky foam, etc.
   - Blowing of compressed air on panel.

3. Prepare the spraying equipment.
   - Inspection of spraying area and compliance with occupational health and safety requirements: electrical safety, fresh air supply, evacuation of foul air, vapour control, etc.
   - Inspection of protective gear: full mask or hood, suit, gloves, etc.
   - Types of guns and nozzles used for primer-sealers, paints and clear coats.

4. Prepare the products: primer-sealer, paint and clear coat.
   - Determination of colour variation (see Competency 18).
   - Types of primer-sealers: epoxy resin-based, urethane resin-based, etc.
   - Types of paints: water-based, solvent-based, single-stage, etc.
   - Types of finishes: glossy, matte, etc.
   - Types of application procedures: one coat, two coats, three coats.
   - Types of clear coats: urethane, ceramic, etc.
   - Calculation of quantities based on the mix ratio and the surface to be covered.
   - Use of scale, measuring sticks, graduated cups, etc.
   - Requirements for working in a mixing room: preparation area, vapour control, ignition source control, etc.

5. Adjust the colour.
   - Adjustment of gun: air pressure at input or output (air cap), spray width, etc.
   - Adjustment of colours by adding a colour base, a metallic dye, black, white, etc.
   - Application of primer-sealer (if applicable), paint and clear coat (if applicable) on a test panel.

6. Apply the products: primer-sealer, paint and clear coat.
   - Adjustment of gun: air pressure at input or output (air cap), spray width, etc.
   - Application on a complete or partial panel: number of coats, blend, drying time, etc.
   - Application requirements: overlap, distance between surface and gun, spray speed, etc.

7. Inspect the work.
   - Imperfections: runs, contamination, orange peel, uneven finish, etc.
   - Sanding techniques: choice of sandpaper grit, sanding block, pneumatic sander, orbital sander, etc.
   - Polishing of surface using polishing paste.

8. Finish the job.
   - Cleaning of spraying equipment: disassembly, washing with solvent, brushing, etc.
   - Information: work done, time, difficulties encountered, decisions made, etc.
   - Importance of a clean work area and proper storage of tools, equipment and products.

Preparing a Vehicle for Delivery	Code: 845496

Competency 20 Duration 90 hours Credits 6

Behavioural Competency

Statement of the Competency

Prepare a vehicle for delivery.

Achievement Context

- Working with automobiles or on-road heavy vehicles.
- Given an estimate or a work order.
- Using technical documentation.
- Using the necessary tools, measuring instruments and lifting and other equipment.
- Using cleaning and assembly products and lubricants.
- Using the necessary protective equipment.

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of estimate or work order. • Proper determination of sequence of operations.
2. Reassemble and install body parts.	• Precise fastening and adjustment of removable panels. • Proper fastening of related elements. • Proper reconnection of electrical and electronic components. • Proper application of rust protection. • Proper installation of trim. • Proper installation of accessories. • Proper adjustment of electrical and electronic systems.
3. Inspect the work.	• Thorough inspection. • Appropriate inspection of mechanical devices and electrical and electronic components. • Relevant corrections made.
4. Finish the job.	• Complete cleaning of body and passenger compartment. • Meticulous polishing of surfaces. • Appropriate use of pre-delivery inspection lists. • Clear and complete indication of all the work done. • Proper storage of tools, measuring instruments, lifting and other equipment and products. • Cleanliness of work area.

For the competency as a whole:

- Appropriate choice and use of tools, measuring instruments, lifting and other equipment and products.
- Compliance with the requirements of the estimate or work order.
- Respect for the condition of the vehicle
- Compliance with occupational health and safety rules.
- Compliance with environmental protection rules.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each element of the competency, along with their attendant guidelines.

1. Plan the work.
   - Interpretation of estimate or work order (see Competency 4).
   - Determination of sequence of operations based on the estimate or work order.

2. Reassemble and install body parts.
   - Fastening and adjustment of removable panels and related elements.
   - Reconnection of electrical and electronic components.
   - Application of aerosol or spray rust protection.
   - Reinstallation of trim.
   - Installation of accessories: window or hood deflectors, running boards, etc.
   - Adjustment of electrical and electronic systems based on the type of body part installed.

3. Inspect the work.
   - Inspection of the various body parts and mechanical devices.
   - Inspection of electrical and electronic components (see Competencies 9 and 10).

4. Finish the job.
   - Cleaning of body and passenger compartment.
   - Polishing of surface using polishing paste and wax.
   - Content of inspection list and points to check.
   - Information: work done, time, difficulties encountered, decisions made, etc.
   - Importance of a clean work area and proper storage of tools, measuring instruments, lifting and other equipment and products.

Practicum in the Workplace	Code: 845506

Competency 21 Duration 90 hours Credits 6

Situational Competency

Statement of the competency

Enter the work force.

Elements of the Competency

- Become familiar with the practice of the trade in a company.
- Integrate the knowledge, skills, attitudes and habits acquired during training.
- Learn about the changes in perception caused by time spent in the workplace.

Learning Context

Information Phase

- Learning about the terms and conditions of the practicum.
- Setting criteria for selecting companies.
- Learning about the various companies that accept trainees: location, size, type of work, etc.
- Taking steps to obtain a practicum position.

Participation Phase

- Observing the work context.
- Carrying out or participating in various work-related tasks.
- Keeping a log in which they record their observations about the work context and the tasks carried out in the workplace.

Synthesis Phase

- Identifying aspects of the trade that correspond to the training received, and those that do not.
- Discussing the impact of their experience during the practicum on choosing a job: aptitudes and fields of interest.

Instructional Guidelines

- Maintain close collaboration between the school and the company.
- Provide students with the documentation needed to prepare for the practicum and to keep a log.
- Enable students to perform work-related tasks.
- Provide students with regular supervision during the practicum.
- Make sure that students are constantly supervised by a person in the company.
- Intervene in the case of difficulties or problems.

Participation Criteria

Information Phase

- List companies that meet their predetermined selection criteria.
- Meet with a person in the company with a view to obtaining a practicum position.

Participation Phase

- Comply with company policies concerning the tasks they are allowed to perform as trainees, work schedules, occupational health and safety rules and professional ethics.
- Record information about the work context and the tasks performed in the company.

Synthesis Phase

- Produce a practicum report:
  - detailing the specific characteristics of the workplace with respect to the training received
  - highlighting their strengths and weaknesses with respect to the trade
  - including a self-evaluation of their work and participation during the practicum.

Suggestions for Competency-Related Knowledge and Know-How

The following is a summary of the knowledge, skills, strategies, attitudes and perceptions related to each phase of the learning context, along with their attendant guidelines.

Information Phase

- Consultation of documentation concerning practicum positions.
- Type of company: body shop, automobile dealership, on-road heavy vehicle dealership, on-road heavy vehicle repair centre, etc.
- Search for a practicum position.
- Company staff: estimator, office worker, mechanic, shop manager, etc.
- Work schedules and service structure.
- Agreement on the terms and conditions of the practicum.

Participation Phase

- Occupational health and safety (see Competency 2).
- Professional attitude and teamwork.
- Information about their experience in the workplace: schedule, difficulties encountered, activities carried out, etc.

Synthesis Phase

- Contents of report: profile of the company, first impressions, observations, specific situations experienced and reactions.
- Aptitudes and fields of interest (see Competency 1).

Glossary

The *Auto Bodywork* program includes a glossary of terms used.

Glass

All structural and non-structural fixed and moveable glass components: windshield, side windows, rear window, sunroof, etc.

Panels

Parts of an automobile that are mechanically attached, welded or bonded to the frame or structural components. Panels can be fixed or removable.

- Removable panels (mechanically attached using rivets, bolts, etc.): doors, fenders, hoods, bumpers, tailgates, etc.
- Fixed panels (usually welded or bonded): door skins, fenders, side panels, roofs, etc.

Structural components

All primary body surfaces that support vehicle weight and that have an effect on road handling or shock resistance capacity: engine compartment, subframe, side members, rocker panels, pillars, structural glass, etc.

Trim

All the materials and elements used inside and outside the vehicle to improve safety, comfort or appearance: mouldings, rear-view mirrors, locks, handles, seats, consoles, etc.

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