PROGRAM OF STUDY

TINSMITHING (DVS 5860)

Training sector
METALLURGICAL TECHNOLOGY

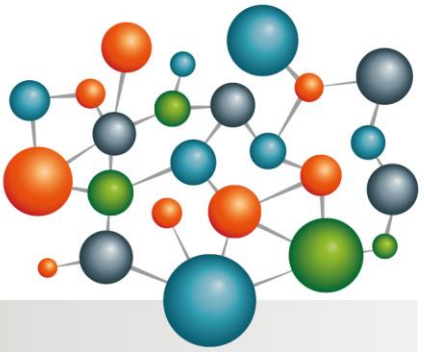

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Table of Contents

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.

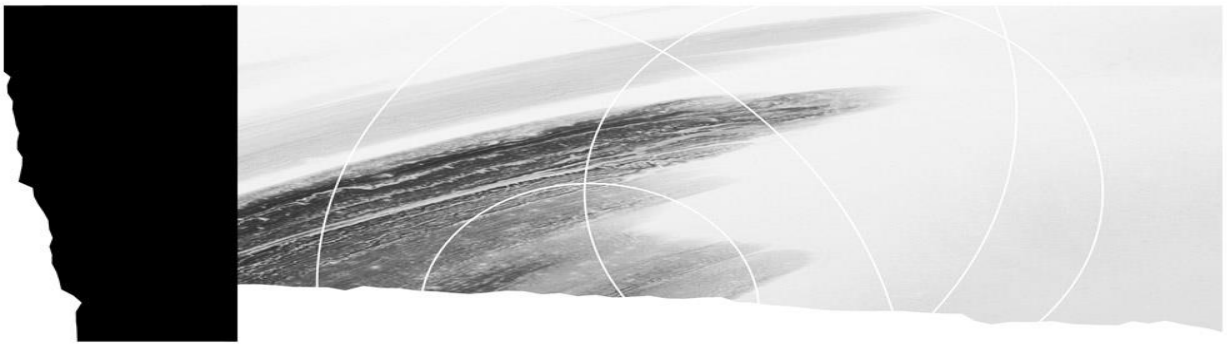
Aspects of Program Implementation

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 of 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 as 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 carried out in situations that are relevant to the students' working life and personal life.



5860	**Tinsmithing**
Year of approval:	2017

Certification:	Diploma of Vocational Studies
Number of credits:	107
Number of competencies:	25
Total duration:	1605 hours

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

- Persons must hold 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 meet the following condition: they 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

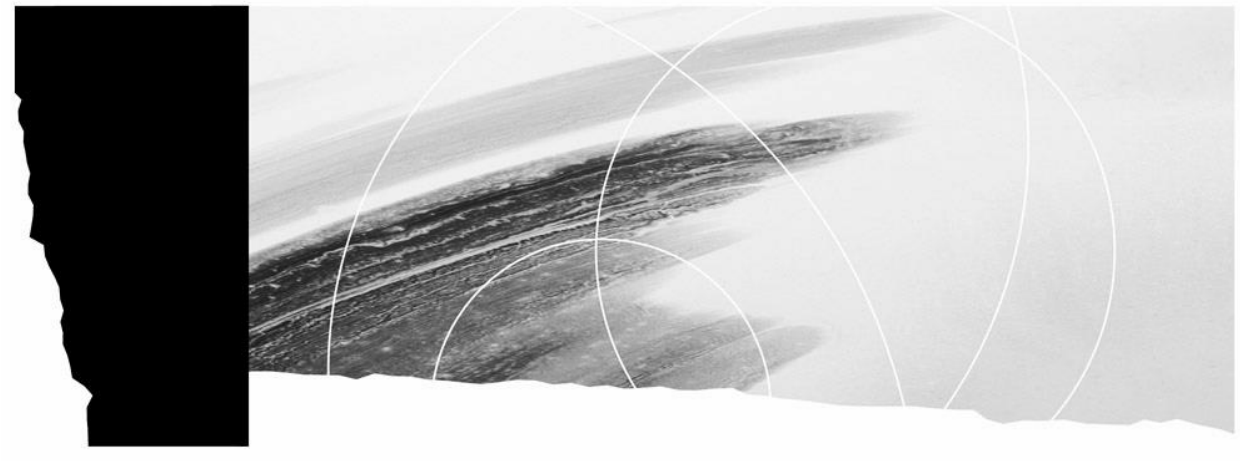
- Persons who are at least 18 years of age in the school year in which they begin their training must have the following functional prerequisites: the successful completion of the General Development Test (GDT) and the specific prerequisites for the program (i.e. ENG 2102-4 and MTH 4153-2), or recognition 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 1605 hours, which includes 600 hours spent on the specific competencies required to practise the trade and 1005 hours on general, work-related competencies. The program of study is divided into 25 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	802691	1	15	1
Sheet Metal Calculations	802703	2	45	3
Sketching Parts	802715	3	75	5
Using Hand and Portable Tools	802726	4	90	6
Oxygen and Plasma Cutting	802733	5	4	3
Electric Arc Welding Using Covered Electrodes	802743	6	45	3
Parts Development Methods	802756	7	90	6
Basic Cutting and Shaping Machine Tool Applications	802766	8	90	6
Electric Arc Welding Using Fusible Electrodes	802774	9	60	4
Fabricating Mechanical Joints	802784	10	60	4
Welding Using Non-fusible Electrodes and Resistance Welding	802795	11	75	5
Health and Safety on Construction Sites	754992	12	30	2
Parts Fabrication	802808	13	120	8
Installation Plans and Specifications	802816	14	90	6
Using Access Equipment	802824	15	60	4
Installing Anchors and Suspension Devices	802834	16	60	4
Handling and Hoisting Operations	802843	17	45	3
Installing Prefabricated Metal Objects	802854	18	60	4
Installing Metal Wall Coverings	802865	19	75	5
Installing Prefabricated Metal Roofing	802876	20	90	6
Heritage Roofing	802887	21	105	7
Installing Rectangular Air Treatment, Heat Recovery and Exhaust Systems	802895	22	75	5
Installing Cylindrical Air Treatment, Heat Recovery and Exhaust Systems	802905	23	75	5
Construction Industry Organizations	754991	24	15	1
Job Search Techniques	802911	25	15	1



Part I

Program Goals

Educational Aims

Statements of the Competencies

Grid of Competencies

Harmonization

Program Goals

The *Tinsmithing* program prepares students to practise the trade of Tinsmith.

Tinsmiths work on institutional, commercial, industrial and residential construction sites, and in the civil engineering and road work sectors. However, most of them work in the institutional and commercial sectors.

Tinsmiths cut, shape, assemble and weld different types of metal products. They install prefabricated metal objects, wall coverings and heritage and modern roofing, as well as air treatment, heat recovery and exhaust system ducts. They also fabricate tinsmithing parts out of plates, profiles and similar materials.

Tinsmiths usually work in teams, following plans and specifications and in compliance with current standards. They use bench tools as well as access, hoisting, handling, cutting, shaping and welding equipment. They also use measuring and scribing instruments to draw sketches and patterns for parts.

Tinsmiths must have good manual dexterity and physical endurance. They must be able to work at heights. Health and safety rules and measures must be respected at all times and are an integral part of the trade.

The program goals of the *Tinsmithing* 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 and initiative
  - 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 equip students to manage their career

Educational Aims

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

- Instill in them a sense of conscientiousness and pride in their work.
- Encourage the development of a sense of responsibility, punctuality and diligence.
- Foster teamwork, a sense of belonging and respect for others.
- Foster the development of problem-solving skills in various assembly and installation situations.
- Promote sustainable development and recycling.

Statements of the Competencies

List of Competencies

- Determine their suitability for the trade and the training process.
- Do sheet metal calculations.
- Sketch parts.
- Use hand and portable tools.
- Use oxygen and plasma cutting techniques.
- Arc weld using covered electrodes.
- Develop parts.
- Perform basic cutting and shaping operations using machine tools.
- Arc weld using fusible electrodes.
- Fabricate mechanical joints.
- Arc weld using non-fusible electrodes and perform resistance welding operations.
- Prevent threats to health, safety and bodily security on construction sites.
- Fabricate parts.
- Process information in installation plans and specifications.
- Use access equipment.
- Install anchors and suspension devices.
- Perform handling and hoisting operations.
- Install prefabricated metal objects.
- Install metal wall coverings.
- Install prefabricated metal roofing.
- Cover heritage roofs using traditional metal or similar materials.
- Install rectangular air treatment, heat recovery and exhaust systems.
- Install cylindrical air treatment, heat recovery and exhaust systems.
- Learn about construction industry organizations.
- Use job search techniques.

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.

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. 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 of the competencies will be taught.

GRID OF COMPETENCIES

TINSMITHING				GENERAL COMPETENCIES																			TOTAL
SPECIFIC COMPETENCIES	**Competency number**	**Type of competency**	**Duration (in hours)**	Determine their suitability for the trade and the training process	Do tinsmthing calculations	Sketch parts	Use hand and portable tools	Use oxygen and plasma cutting techniques	Arc weld using covered electrodes	Develop parts	Perform basic cutting and shaping operations using machine tools	Arc weld using fusible electrodes	Fabricate mechanical joints	Arc weld using non-fusible electrodes and perform resistance welding operations	Prevent threats to health, safety and bodily security on construction sites	Process information in installation drawings and specifications	Use access equipment	Install anchors and suspension devices	Perform handling and lifting operations	Learn about construction industry organizations	Use job search techniques	
Competency number				1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17	24	25	
Type of competency				S	B	B	B	B	B	B	B	B	B	B	S	B	B	B	B	S	B	
Duration (in hours)				15	45	75	90	45	45	90	90	60	60	75	30	90	60	60	45	15	15	1005
Fabricate parts	13	B	120	○	●	●	●	●	●	●	●	●	●	○	●		○		○	○	○	
Install prefabricated metal objects	18	B	60	○	●		●	○	●		●	●	●	●	●	●	○	●	●	○	○	
Install metal wall coverings	19	B	75	○	●		●	○	○		●	○	●	○	●	●	●	●	●	○	○	
Install prefabricated metal rooking	20	B	90	○	●	○	●		○	○	●	○	●	○	●	●	●	○	●	○	○	
Cover heritage roofs using traditional metal or similar materials	21	B	105	○	●	●	●		○	●	●	○	●	○	●	●	●	○	●	○	○	
Install rectangular air treatment, heat recovery and exhaust systems	22	B	75	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	
Install cylindrical air treatment, heat recovery and exhaust systems	23	B	75	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	
Total Duration (in hours)			600																			1605

Links between the general competencies and the specific competencies

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

Harmonization

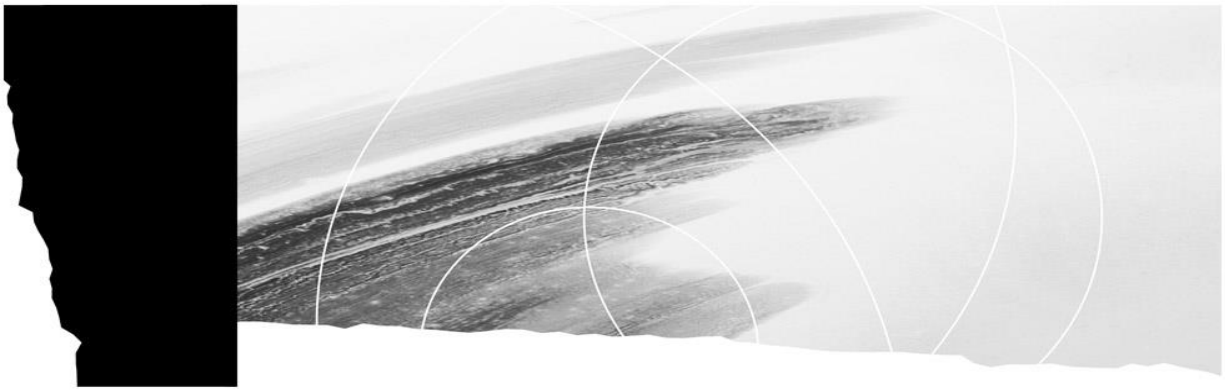
The Ministère de l'Éducation harmonizes its vocational and technical programs by establishing similarities and continuity between secondary- and college-level programs within a particular sector or between sectors in order to avoid overlap in program offerings, to recognize prior learning and to optimize 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.

The *Tinsmithing* program does not share any competencies with other programs at this time.



Part II

Program Competencies

The Trade and the Training Process	Code: 802691

Competency 1 Duration 15 hours Credit 1

Situational Competency

Statement of the Competency

Determine their suitability for the trade and the training process.

Elements of the Competency

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

Learning Context

Information Phase

- Learning about the job market in tinsmithing
- Learning about the nature and requirements of the trade
- Learning about the training process

Participation Phase

- Presenting the information gathered from meetings with specialists and discussing their perception of the trade: advantages, disadvantages, requirements
- Discussing the skills, aptitudes and knowledge needed to practise the trade
- Discussing the program of study as it relates to the trade

Synthesis Phase

- Producing a report in which they:
  - sum up their aptitudes and interests with regard to the trade
  - assess their career choice by comparing different aspects and requirements of the trade with their aptitudes and interests

Instructional Guidelines

- Create a climate in which students can express themselves freely
- Make the appropriate documentation available
- Organize a meeting with specialists in the trade
- 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

Participation Phase

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

Synthesis Phase

- Produce a report in which they:
  - sum up their interests and aptitudes with respect to the trade
  - 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, volume of work required, rules, student services, timetable, etc.
- Connection between program competencies and tasks, operations, knowledge and skills

Synthesis Phase

- Presentation methods: notes, summaries and presentations
- Report on their strengths and weaknesses as they relate to the requirements of the trade
- Justification of their career choice

Tinsmithing Calculations	Code: 802703

Competency 2 Duration 45 hours Credits 3

Behavioural Competency

Statement of the Competency

Do tinsmithing calculations.

Achievement Context

- Based on measurements
- Using a calculator

Elements of the Competency	Performance Criteria
1. Perform basic mathematical operations on measurements.	• Accurate use and conversion of imperial and metric units of measurement • Accurate calculations with fractions and whole numbers
2. Calculate angles, distances, perimeters, areas and volumes.	• Appropriate choice of calculation method • Proper use of unit of measurement
3. Calculate quantities of materials.	• Sound reasoning • Appropriate application of the rule of three • Accurate quantities
	For the competency as a whole: • Appropriate use of calculator • Appropriate use of mathematical formulas

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. Perform basic mathematical operations on measurements.
   - Addition, subtraction, multiplication and division of whole numbers, decimals and fractions
   - Conversion of whole numbers and decimals from one system of measurement to the other
2. Calculate angles, distances, perimeters, areas and volumes.
   - Application of mathematical formulas to calculate angles, distances, perimeters, areas and volumes of geometric shapes
   - Pythagorean theorem
   - Trigonometric functions: sine, cosine and tangent
3. Calculate quantities of materials.
   - Application of mathematical formulas and the rule of three to calculate unit quantities, linear quantities and areas

Sketching Parts	Code: 802715

Competency 3 Duration 75 hours Credits 5

Behavioural Competency

Statement of the Competency	**Achievement Context**
Sketch parts.	• Given tinsmithing parts • Freehand and using drafting instruments

Elements of the Competency	**Performance Criteria**
1. Determine the type of sketch required.	• Accurate identification of the type of part to be sketched • Identification of all the geometric shapes that make up the part • Appropriate choice of scale • Appropriate choice of view to use
2. Draw the geometric shapes that make up the part.	• Proper representation of multiple views, sections and 3D views • Clear, precise lines • Appropriate use of drafting instruments or freehand techniques • Compliance with proportions or scale
3. Fill out the sketch.	• Proper and clear indication of dimensions and complementary information • Compliance with standards of symbolic representation
	For the competency as a whole: • Legible sketch

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. Determine the type of sketch to produce.
   - Types of parts to draw: mouldings, supports, cylindrical and rectangular fittings, starting parts, parts for roofing, parts for wall coverings, etc.
   - Geometric shapes in the parts: squares in a box, circles and rectangles in a cylinder, etc.
   - Scales: 1/8, 1/4, metric and imperial systems
   - Choice of scale and view based on the size of the part and the format of the drawing sheet

2. Draw the geometric shapes that make up the part.
   - Scribing methods: line, angle, perpendicular, line division, geometric shapes, etc.
   - Use of rulers, compasses, squares, protractors, etc.

3. Fill out the sketch.
   - Dimensions and symbolic representation: scales, symbols, types of lines, etc.
   - Reference systems and axes

Using Hand and Portable Tools	Code: 802726

Competency 4 Duration 90 hours Credits 6

Behavioural Competency

Statement of the Competency

Use hand and portable tools.

Achievement Context

- Given instructions
- Using measuring and scribing instruments
- Using hand tools: shears, hammers, pliers, screwdrivers, wrenches, files, anvils, vises, etc.
- Using power tools: drills, angle grinders, metal circular saw and other types of metal saws, polishing tools, etc.
- Using accessories: blades, drill bits, grinding wheels, guides, etc.
- Using sheet metal and metal profiles
- Using personal and collective safety gear

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of instructions • Appropriate choice of tools and accessories • Proper use of personal and collective safety gear
2. Prepare the tools.	• Appropriate inspection of tools and accessories • Proper installation of accessories • Appropriate adjustment of tools
3. Measure and scribe materials.	• Appropriate choice and use of measuring and scribing instruments • Precise measurements and scribing
4. Use manual machining techniques.	• Proper positioning of materials to be machined • Cutting, drilling and punching operations in compliance with instructions
5. Perform manual shaping operations.	• Proper positioning of materials to be shaped • Embossing and bending in compliance with instructions
6. Finish surfaces.	• Proper positioning of materials to be finished • Filing, grinding and deburring operations in compliance with instructions

7. Finish the job.	• Proper use of preventive maintenance techniques for tools • Instruments, tools and accessories properly put away • Cleanliness of work area
	For the competency as a whole:
	• Appropriate choice and use of hand and power tools • Compliance with instructions • 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. Plan the work.
   - Instructions for manual machining, shaping and finishing operations
   - Choice of tools and accessories based on the job
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, etc.

2. Prepare the tools.
   - Inspection of tools and accessories and replacement of components if needed
   - Installation of accessories: blades, drill bits, grinding wheels, guides, etc.
   - Adjustment of tools: cutting speed, rpm, safety guards, etc.

3. Measure and scribe materials.
   - Choice of instruments based on the item to be measured and scribed (line, angle, curve)
   - Use of measuring and scribing instruments: rulers, squares, compasses, protractors, calipers, tape measures, scribers, centre punches, chalk lines, etc.
   - Meaning of units of measure

4. Use manual machining techniques.
   - Positioning of material on the work surface and tool
   - Use of pliers, vises, wrenches, etc.
   - Use of tools and compliance with safety instructions: shears, hammers, drills, angle grinders, metal circular saws and other metal saws, etc.

5. Perform manual shaping operations.
   - Positioning of material on the work surface and tool
   - Use of tools and compliance with safety instructions: pliers, hammers, anvils, angle grinders, etc.
   - Creation of shapes and reliefs through embossing and bending

6. Finish surfaces.
    - Positioning of material on the work surface
    - Use of tools and compliance with safety instructions: angle grinders, polishing tools, grinding wheels, files, etc.

7. Finish the job.
    - Importance of putting things away and keeping the work area clean
    - Preventive maintenance techniques for hand and portable tools: lubrication and tightening

Oxygen and Plasma Cutting	Code: 802733

Competency 5 Duration 45 hours Credits 3

Behavioural Competency

Statement of the Competency

Use oxygen and plasma cutting techniques.

Achievement Context

- Given instructions
- Given an oxygen cutting machine, a plasma cutting machine and cutting accessories
- Using measuring and scribing instruments and plasma cutting software
- Using ferrous and nonferrous sheet metal, plates and profiles
- Using personal and collective safety gear

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of instructions • Appropriate choice of cutting accessories • Proper use of personal and collective safety gear
2. Prepare the cutting machine.	• Appropriate inspection of equipment and accessories • Proper replacement of damaged components • Proper assembly of cutting machine • Proper adjustment of cutting machine
3. Make straight, curved or angled cuts on sheet metal, plates and profiles.	• Precise scribing of cutting lines • Proper positioning of metals • Appropriate inspection of cuts • Cuts in compliance with requirements • Appropriate work posture • Compliance with manufacturer's instructions for using nozzles • Minimal loss of material
4. Finish the job.	• Proper disassembly of cutting machine • Instruments, equipment and cutting accessories properly put away • Cleanliness of work area

For the competency as a whole:

- Appropriate use of plasma cutting software
- Compliance with instructions
- Compliance with work methods
- Compliance with requirements associated with the application of oxygen and plasma cutting techniques
- 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. Plan the work.
   - Instructions: imperial and metric measurements, conversion of units, etc.
   - Choice of tools and accessories based on their availability, the type of material, the requirements of the job, thicknesses, etc.
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, welder's jacket, screen, fume collector, etc.

2. Prepare the cutting machine.
   - Oxygen cutting machine: cylinder, hose, torch, nozzle, regulator, etc.
   - Procedures for assembling the oxygen cutting machine depending on the type of gas used
   - Inspection and replacement of fittings, hoses, clamps, etc.
   - Plasma cutting machine: torch, shielding gas, nozzle, electrode, O-ring, etc.
   - Procedures for assembling the plasma cutting machine depending on the type of gas used and the polarity
   - Procedure for starting up and shutting down a cutting machine and compliance with safety rules
   - Use of plasma cutting software and entry of part dimensions

3. Make straight, curved or angled cuts on sheet metal, plates and profiles.
   - Positioning of materials with vises, clamps, locking clamps, etc.
   - Oxygen cutting settings: fuel gas and oxygen pressure
   - Plasma cutting settings: air pressure and current intensity
   - Cut and travel feed

4. Finish the job.
   - Importance of disassembling the machine, putting things away and keeping the work area clean

Electric Arc Welding Using Covered Electrodes	Code: 802743

Competency 6 Duration 45 hours Credits 3

Behavioural Competency

Statement of the Competency

Arc weld using covered electrodes.

Achievement Context

- Following instructions and welding processes
- Using an electric arc welding machine, covered and bare electrodes and welding accessories
- Using ferrous plates and profiles
- Using personal and collective safety gear

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of instructions and welding processes • Appropriate choice of electrodes • Proper use of personal and collective safety gear
2. Prepare the welding machine.	• Appropriate inspection of equipment and accessories • Proper replacement of damaged components • Proper assembly of welding machine
3. Prepare the plates and profiles for welding.	• Proper bevelling and cleaning of plates and profiles • Proper positioning of plates and profiles
4. Tack the material.	• Proper determination of tacking sequence • Appropriate use of tacking techniques • Size and position of tack welds in compliance with requirements • Solid tack welds • Proper and thorough inspection of tack welds
5. Weld the material.	• Proper determination of welding sequence • Appropriate use of welding techniques • Proper bead size • Regular striations on bead • Proper cleaning of bead • Proper and thorough inspection of bead • Absence of porosity • Appropriate penetration of filler metal

6. Finish the job.	• Proper disassembly of welding machine • Equipment and welding accessories properly put away • Cleanliness of work area
	For the competency as a whole:
	• Appropriate adjustment of welding equipment • Appropriate work posture • Appropriate use of methods for controlling thermal deformation • Compliance with instructions • Compliance with welding processes • Compliance with work methods • 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. Plan the work.
   - Instructions: types of assembly, symbols, applicable standards, tolerances, etc.
   - Welding processes: types of joints, angles, bevels, diameters, welding positions, etc.
   - Choice of electrodes based on their classification and mechanical properties, the type of material and assembly, thicknesses, etc.
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, welder's jacket, screen, fume collector, etc.

2. Prepare the welding machine.
   - Welding accessories: wire brushes, slag hammers, etc.
   - Electric arc welding machine with covered electrodes: welding cables, ground clamps, electrode holder, etc.
   - Assembly of machine based on polarity
   - Replacement of welding cable connectors, clamps, etc.

3. Prepare the plates and profiles for welding.
   - Use of grinder
   - Bevel angle based on the welding process
   - Cleaning and removal of carbon deposits
   - Types of assembly: butt joint, lap joint, T-joint, etc.

4. Tack the material.
   - Determination of size, position and sequence of tack welds based on the material's metallurgical qualities, the type of assembly, thicknesses, etc.

- Adjustment of intensity based on the type and thickness of the material, the diameter of the electrode, etc.
- Tacking techniques: striking the arc, arc length, angle of the electrode, etc.
- Tack weld defects: porosity, lack of fusion and slag inclusion

5. Weld the material.
   - Determination of welding sequence based on type of assembly, bead sizes and depths
   - Welding techniques based on position, electrode angle, arc length, travel speed, etc.
   - Tack weld defects: lack of fusion, porosity, undercuts, slag inclusion, excessive buildup, shallowness, etc.

6. Finish the job.
   - Importance of disassembling the machine, putting things away and keeping the work area clean

Parts Development Methods	Code: 802756

Competency 7 Duration 90 hours Credits 6

Behavioural Competency

Statement of the Competency	**Achievement Context**
Develop parts.	• Given sketches of tinsmithing parts • Using drafting instruments
Elements of the Competency	**Performance Criteria**
1. Interpret the sketch.	• Accurate identification of the type of part to be developed • Accurate interpretation of measurements and scale • Identification of all the geometric shapes in the sketch • Choice of appropriate development method
2. Apply the development method.	• Appropriate use of parallel, triangulation and radial line development methods • Clear, precise lines • Accurate determination of dimensions • Accurate calculations • Appropriate verification of results
3. Draw the pattern for the part.	• Precise scribing of contours • Proper identification of the different parts of the whole • Compliance with sketch
	For the competency as a whole: • Appropriate choice and use of drafting instruments

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. Interpret the sketch.
   - Types of parts: mouldings, supports, cylindrical and rectangular fittings, starting parts, roofing parts, wall covering parts, etc.
   - Geometric shapes: squares in a box, circles and rectangles in a cylinder, etc.
   - Choice of development method based on the shape of the part

2. Apply the development method.
    - Parallel development: prisms, elbows, cylinders, etc.
    - Triangulation development: connectors, reducers, transitions, etc.
    - Radial line development: cones, pyramids, reducers, transitions, etc.
    - Use of rulers, compasses, squares, protractors, etc.
    - Dimensions and calculation of areas, perimeters and circumferences

3. Draw the pattern for the part.
    - Use of rulers, compasses, squares, protractors, etc.
    - Identification of the parts of the whole: throat, back, right cheek, left cheek, etc.

Basic Cutting and Shaping Machine Tool Applications	Code: 802766

Competency 8 Duration 90 hours Credits 6

Behavioural Competency

Statement of the Competency

Perform basic cutting and shaping operations using machine tools.

Achievement Context

- Given instructions and fabrication sheets
- Using cutting machine tools: foot-operated guillotine shears, hydraulic guillotine shears, etc.
- Using manual benders, hydraulic benders, etc.
- Using manual rollers, motorized rollers, etc.
- Using bending accessories: dies, punches, etc.
- Using sheet metal and profiles
- Using personal and collective safety gear

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of instructions and fabrication sheets • Appropriate choice of equipment • Proper determination of operations to be carried out • Proper use of personal and collective safety gear
2. Cut materials.	• Appropriate inspection of cutting machine tools • Proper adjustment of cutting machine tools • Proper positioning of materials to be cut • Cuts in compliance with requirements
3. Shape materials.	• Appropriate inspection of shaping machine tools • Proper installation of accessories on bender • Proper adjustment of shaping machine tools • Proper positioning of materials to be shaped • Parts bent and rolled in compliance with requirements
4. Finish the job.	• Proper application of preventive maintenance procedures for cutting and shaping machine tools • Accessories properly put away • Cleanliness of work area

For the competency as a whole:

- Careful handling of material
- Compliance with instructions
- Compliance with cutting and shaping machine tool capacities
- 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. Plan the work.
    - Instructions and fabrication sheets: imperial and metric measurements, conversion of units, etc.
    - Choice of equipment based on type of part to cut and shape, type of material and thickness
    - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, etc.

2. Cut materials.
    - Types of shears, inspection of main components and safety devices
    - Adjustment of cutting machine tools based on the type and thickness of the material
    - Squaring methods
    - Positioning of part on support, using clamps, etc.
    - Use of cutting machine tools and compliance with safety instructions

3. Shape materials.
    - Types of benders and rollers, inspection of main components and safety devices
    - Installation of dies and punches based on the type and thickness of the material
    - Adjustment of shaping machine tools based on the type and thickness of the material
    - Squaring methods
    - Positioning of material based on the type of shaping machine tool
    - Use of benders and rollers and compliance with safety instructions

4. Finish the job.
    - Importance of cleanliness and tidiness

Electric Arc Welding Using Fusible Electrodes	Code: 802774

Competency 9 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	**Achievement Context**
Arc weld using fusible electrodes.	• Given instructions and welding processes • Using an electric arc welding machine, fusible electrodes and welding accessories • Using sheet metal, plates and profiles • Using personal and collective safety gear
Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Accurate interpretation of instructions and welding processes • Appropriate choice of fusible electrodes and type of gas • Proper use of personal and collective safety gear
2. Prepare the welding machine.	• Appropriate inspection of equipment and accessories • Proper replacement of damaged components • Proper assembly of welding machine
3. Prepare the sheet metal, plates and profiles for welding.	• Proper bevelling and cleaning of plates and profiles • Proper positioning of sheet metal, plates and profiles
4. Tack the material.	• Proper determination of tacking sequence • Use of appropriate tacking techniques • Size and position of tack welds in compliance with requirements • Solid tack welds • Proper and thorough inspection of tack welds
5. Weld the material.	• Proper determination of welding sequence • Appropriate use of welding techniques • Proper bead size • Regular striations on bead • Proper cleaning of bead • Proper and thorough inspection of bead • Absence of porosity • Appropriate penetration of filler metal

6. Finish the job.	• Proper disassembly of welding machine • Equipment and welding accessories properly put away • Cleanliness of work area
	For the competency as a whole:
	• Appropriate adjustment of welding equipment • Appropriate work posture • Appropriate use of methods for controlling thermal deformation • Compliance with instructions • Compliance with welding processes • Compliance with work methods • 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. Plan the work.
   - Instructions: types of assembly, symbols, applicable standards, tolerances, etc.
   - Welding processes: types of joints, angles, bevels, diameters, welding positions, etc.
   - Choice of fusible electrodes and type of gas based on type of material, type of assembly, thicknesses, etc.
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, welder's jacket, screen, fume collector, etc.

2. Prepare the welding machine.
   - Welding accessories: wire brushes, slag hammers, pressure gauge, etc.
   - Arc welding machine with fusible electrodes: welding cables, handles, wheels, nozzles, ground clamps, etc.
   - Assembly of machine based on type of material, type of assembly, thicknesses, etc.
   - Replacement of welding cable connectors, clamps, etc.

3. Prepare the sheet metal, plates and profiles for welding.
   - Use of grinder
   - Bevel angle based on welding process
   - Cleaning and removal of carbon or grease deposits
   - Types of assembly: butt joint, lap joint, T-joint, J-joint, etc.

4. Tack the material.
   - Determination of size, position and sequence of tack welds based on the material's metallurgical qualities, the type of assembly, thicknesses, etc.

- Adjustment of intensity and speed of electrode based on the type and thickness of the material, the diameter of the electrode, etc.
- Tacking techniques: striking the arc, arc length, torch angle, etc.
- Tack weld defects: porosity, lack of fusion and slag inclusion

5. Weld the material.
   - Determination of welding sequence based on type of assembly, bead size and depths
   - Welding techniques based on position, torch angle, arc length, travel speed, etc.
   - Tack weld defects: lack of fusion, porosity, undercuts, slag inclusion, excessive buildup, shallowness, etc.

6. Finish the job.
   - Importance of disassembling the machine, putting things away and keeping the work area clean

Fabricating Mechanical Joints	Code: 802784

Competency 10 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	**Achievement Context**
Fabricate mechanical joints.	• Given instructions and fabrication sheets • Using measuring and scribing instruments • Using shaping tools: metal shaper, milling cutter, tinsmithing mill, etc. • Using mechanical assembly tools: drill, riveter, crimper, pliers, hammers, anvils, etc. • Using sheet metal and profiles • Using personal and collective safety gear

Elements of the Competency	**Performance Criteria**
1. Plan the shaping and assembly work.	• Accurate interpretation of instructions and fabrication sheets • Appropriate choice of equipment • Proper determination of operations • Proper use of personal and collective safety gear
2. Prepare the shaping tools.	• Appropriate inspection of shaping tools • Proper adjustment of shaping tools
3. Prepare the sheet metal.	• Accurate calculation of dimensions for joint shaping and assembly • Precise measurements and scribing • Precise cutting and notching of sheet metal
4. Shape the joints.	• Proper positioning of sheet metal to be shaped • Appropriate use of shaping tools • Compliance with requirements for shaping joints
5. Assemble the sheet metal.	• Selection of fasteners based on type of joint • Proper positioning of sheet metal to be assembled • Compliance with riveting, screwing, bolting and clipping methods • Appropriate use of hand tools • Compliance with sealing requirements • Compliance with requirements for finishing joints

6. Finish the job.	• Proper use of preventive maintenance procedures for tools • Instruments, tools and accessories properly put away • Cleanliness of work area *For the competency as a whole:* • Appropriate choice and use of measuring and scribing instruments • Compliance with instructions • 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. Plan the shaping and assembly work.
   - Instructions and fabrication sheets: imperial and metric measurements, conversion of units, etc.
   - Choice of tools based on type of part to shape, type of material and thickness
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, etc.

2. Prepare the shaping tools.
   - Types of shaping tools and inspection of main components and safety devices
   - Adjustment of shaping tools based on type of mechanical joint, type of material and thickness

3. Prepare the sheet metal.
   - Calculation of dimensions for joint shaping and assembly
   - Materials allocation
   - Use of rulers, compasses, squares, protractors, etc.
   - Cutting and notching of sheet metal based on type of mechanical joint, type of material and thickness

4. Shape the joints.
   - Positioning of material based on the type of mechanical joint to be shaped
   - Types of joints: Pittsburgh joint, S-joint with channel, T-joint, locked seam joint, dovetail seam, corner seam, etc.
   - Use of shaping tools and compliance with safety instructions

5. Assemble the sheet metal.
   - Positioning of sheet metal on work surface, using supports, clamps, etc.
   - Use of hand tools and compliance with safety instructions: pliers, hammers, anvils, etc.
   - Types of rivets: blind rivets, rivet nuts, etc.
   - Types of screws: heads and sizes, self-piercing, self-tapping, etc.

- Types of bolts: sizes, threads, toggle bolts, etc.
- Types of clips: fastener clips, attachment clips, channel clips, key clips, etc.

6. Finish the job.
   - Importance of cleanliness and tidiness

Welding Using Non-fusible Electrodes and Resistance Welding	Code: 802795

Competency 11 Duration 75 hours Credits 5

Behavioural Competency

Statement of the Competency

Arc weld using non-fusible electrodes and perform resistance welding operations.

Achievement Context

- Given instructions and welding processes
- Using an arc welding machine with non-fusible electrodes, a resistance welder and welding accessories
- Using ferrous and nonferrous sheet metal, plates and profiles
- Using personal and collective safety gear

Elements of the Competency	Performance Criteria
1. Plan the work.	• Accurate interpretation of instructions and welding processes • Appropriate choice of non-fusible electrodes and filler metal • Proper use of personal and collective safety gear
2. Prepare the arc welding and resistance welding machines.	• Appropriate inspection of equipment and accessories • Proper replacement of damaged components • Proper assembly of welding machine
3. Prepare the sheet metal, plates and profiles for welding.	• Proper bevelling and cleaning of plates and profiles • Proper positioning of sheet metal, plates and profiles
4. Tack the material: – using non-fusible electrodes – using resistance welding	• Proper determination of tacking sequence • Use of appropriate tacking techniques • Size and position of tack welds in compliance with requirements • Solid tack welds • Proper and thorough inspection of tack welds
5. Weld the material using non-fusible electrodes.	• Proper determination of welding sequence • Appropriate use of welding techniques • Proper bead size • Regular striations on bead • Proper finishing of surface • Proper and thorough inspection of bead • Absence of porosity

- Appropriate penetration of filler metal

6. Finish the job.

- Proper disassembly of welding machine
- Equipment and welding accessories properly put away
- Cleanliness of work area

For the competency as a whole:

- Appropriate adjustment of welding equipment
- Appropriate work posture
- Appropriate use of methods for controlling thermal deformation
- Compliance with instructions
- Compliance with welding processes
- Compliance with work methods
- 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. Plan the work.
   - Instructions: types of assemblies, symbols, applicable standards, tolerances, etc.
   - Arc welding processes using non-fusible electrodes: types of joints, angles, bevels, diameters, welding positions, etc.
   - Choice of non-fusible electrodes and filler metal based on type of material, type of assembly, thicknesses, etc.
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, welder's jacket, screen, fume collector, etc.

2. Prepare the arc welding and resistance welding machines.
   - Welding accessories: wire brushes, pressure gauge, etc.
   - Arc welding machine with non-fusible electrodes: welding cables, electrode holders, nozzles, ground clamps, etc.
   - Assembly of arc welding machine with non-fusible electrodes based on type of material, type of assembly, thicknesses, etc.
   - Preparation of resistance welding machine based on its features
   - Replacement of welding cable connectors, clamps, etc.

3. Prepare the sheet metal, plates and profiles for welding.
   - Use of grinder
   - Bevel angle based on welding process
   - Cleaning and removal of carbon or grease deposits
   - Types of assembly: butt joint, lap joint, T-joint, J-joint, etc.

4. Tack the material using non-fusible electrodes and resistance welding.
    - Determination of size, position and sequence of tack welds based on the welding process, the material's metallurgical qualities, the type of assembly, thicknesses, etc.
    - Adjustment of resistance welding time and intensity
    - Adjustment of intensity and gas flow for welding process using non-fusible electrodes
    - Tacking techniques: striking the arc, arc length, torch angle, etc.
    - Tack weld defects: porosity, lack of fusion and slag inclusion

5. Weld using non-fusible electrodes.
    - Determination of welding sequence based on type of assembly, bead sizes and depths
    - Welding techniques based on position, torch angle, arc length, travel speed, etc.
    - Surface finish and use of finishing tools
    - Weld bead defects: lack of fusion, porosity, undercuts, slag inclusion, excessive buildup, shallowness, etc.

6. Finish the job.
    - Importance of disassembling the machine, putting things away and keeping the work area clean

Health and Safety on Construction Sites	Code: 754992

Competency 12 Duration 30 hours Credits 2

Situational Competency

Statement of the Competency

Prevent threats to health, safety and bodily security on construction sites.

Elements of the Competency

- Develop a responsible attitude with regard to health and safety risks.
- Be aware of the importance of complying with occupational health and safety standards and regulations.
- Recognize dangerous situations or risky behaviours and the applicable preventive measures.

Learning Context

Information Phase

- Learning about the risks inherent on construction sites
- Learning about the standards and regulations respecting health and safety on construction sites
- Learning the measures to take in the event of an emergency
- Thinking about the importance of acquiring proficiency in occupational health and safety

Participation Phase

- Participating in situations in which risks must be prevented and dangers eliminated with respect to the environment, facilities, equipment and machinery, materials and tools, energy sources, etc.
- Participating in activities that help them recognize the risks related to moving loads and awkward work postures
- Participating in activities that help them recognize symbols, signs and signals associated with risk prevention (hazardous products, road work, transportation of hazardous materials, etc.)
- Comparing risky behaviours observed on a construction site and identifying the basic principles of safe behaviour

Synthesis Phase

- Presenting a report containing:
  - a summary of their newly acquired knowledge and skills
  - an assessment of their attitude with respect to occupational health and safety
  - their goals and means of improving

Instructional Guidelines

- Provide the necessary information sources
- If applicable, invite specialists in certain aspects of occupational health and safety
- Make the best use of audiovisual materials
- Make extensive use of learning situations that reflect the reality of construction sites

- Prevent students from performing unsafe acts during simulations
- Foster the participation of all students in discussions
- Guide the students in their self-assessment by providing them with the tools needed (e.g. questionnaire) to help them analyze their experience and set personal objectives

Participation Criteria

Information Phase

- Consult the sources of information made available to them
- Describe the advantages of complying with health and safety standards and regulations

Participation Phase

- Participate in the suggested activities and take them seriously
- State the principles of safe behaviour
- Make a list of the risks associated with construction sites and the applicable preventive measures

Synthesis Phase

- Present a report containing:
  - a summary of their newly acquired knowledge and skills
  - an assessment of their attitude with respect to occupational health and safety
  - their objectives and means of preserving their own health, safety and bodily security and those of others on a construction site

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.

Information Phase

- Importance of information about health and safety on construction sites
- The most common threats to health, safety and bodily security on construction sites
- Sources of information about health and safety on construction sites and information searches
- Roles and responsibilities with regard to health and safety on construction sites
- Regulatory framework for health and safety
- Advantages of complying with health and safety rules
- Prevention of illness and accidents

Participation Phase

- Risks inherent in the site itself and in the practice of the trade
- Preventive measures to apply depending on the risks
- Hazardous material identification systems

Parts Fabrication	Code: 802808

Competency 13 Duration 120 hours Credits 8

Behavioural Competency

Statement of the Competency	**Achievement Context**
Fabricate parts.	• Given instructions • Given a fabrication sheet or a sketch of the part • Using sheet metal, plates and profiles • Using measuring and scribing instruments • Using hand and portable tools • Using cutting and shaping machine tools • Using shaping tools for mechanical joints or welding equipment • Using personal and collective safety gear

Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Accurate interpretation of instructions • Accurate interpretation of fabrication sheet or sketch • Proper determination of requirements associated with the fabrication of the part • Appropriate choice of tools and equipment • Proper use of personal and collective safety gear
2. Calculate the dimensions of the part's components.	• Proper determination of type of mechanical joint needed • Appropriate development of the part's components • Proper determination of the quantity of material needed
3. Cut the part's components.	• Appropriate selection of materials • Accurate scribing of pattern on materials • Precise cutting of materials
4. Shape the part's components.	• Proper determination of the different shaping operations • Proper adjustments of machine tool • Proper fabrication of mechanical joints and components • Cutting and fastening of inside insulation based on fabrication requirements

5. Assemble the part's components.	• Proper determination of assembly sequence • Precise positioning of components • Appropriate use of assembly techniques using mechanical joints or proper welding of components • Solid and precise fastening of the part's components • Compliance with sealing requirements
6. Carry out quality control activities.	• Compliance of part with fabrication sheet or sketch • Accurate identification of part
7. Finish the job.	• Instruments, tools and equipment properly put away • Cleanliness of work area
	For the competency as a whole:
	• Careful handling of material • Appropriate choice and use of measuring and scribing instruments • Appropriate use of tools and equipment • Compliance with instructions • Compliance with cutting and shaping machine tool capacities • 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. Plan the work.
   - Instructions, fabrication sheets, requirements and sketches: mouldings, supports, cylindrical and rectangular fittings, starting parts, parts for roofing, parts for wall siding, etc.
   - Choice of machine tool or hand tool based on type of part and thickness
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, etc.

2. Calculate the dimensions of the part's components.
   - Determination of type of mechanical joint based on assembly requirements
   - Development of the part's components (see competency 7)
   - Use of mathematical formulas and determination of the quantity of materials needed (see competency 2)

3. Cut the part's components.
    - Selection of materials based on type of part and eventual use
    - Accurate scribing of pattern on materials (see competency 7)
    - Cutting of materials (see competencies 4, 5 and 8)

4. Shape the part's components.
    - Determination of shaping operations based on type of part and tools
    - Proper adjustment of machine tool (see competency 8)
    - Fabrication of mechanical joints and components (see competencies 4, 8 and 10)
    - Cutting and fastening of inside insulation based on duct fabrication requirements

5. Assemble the part's components.
    - Determination of assembly sequence and positioning of components based on types of parts
    - Fastening of the part's elements using mechanical joints or welding (see competencies 6, 9, 10 and 11)
    - Use of sealants based on fabrication requirements

6. Carry out control activities.
    - Comparison of part with fabrication sheet or sketch
    - Importance for further operations of identifying the part

7. Finish the job.
    - Importance of cleanliness and tidiness

Installation Plans and Specifications	Code: 802816

Competency 14 Duration 90 hours Credits 6

Behavioural Competency

Statement of the Competency

Process information in installation plans and specifications.

Achievement Context

- Given installation plans and specifications for prefabricated metal objects, metal wall coverings, metal roofing or air treatment, heat recovery and exhaust system ducts

Elements of the Competency	Performance Criteria
1. Interpret the general information in the drawing.	• Accurate interpretation of reference systems • Accurate interpretation of dimensions and scales • Accurate distinction between the different symbols used • Recognition of plan views, elevation drawings, section views and detail views • Accurate distinction between the different types of lines used • Relevant connections between the views
2. Identify the tinsmithing components in the drawing and specifications.	• Accurate interpretation of technical data • Precise location of the different devices, accessories, coverings and tinsmithing parts
3. Draw up the materials list.	• Accurate determination of the different devices, accessories, coverings and tinsmithing parts needed for the installation • Accurate determination of the elements and products needed
	For the competency as a whole: • Careful handling of plans and specifications • 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. Interpret the general information in the drawing.
    - Meaning of reference systems, dimensions, scales, symbols, views (plan views, elevation drawings, section views and detail views), types of lines and reference axes relating to the information needed

2. Identify the tinsmithing components in the plans and specifications.
    - Principal features of the installation plans and specifications for prefabricated metal objects, metal wall coverings, prefabricated metal roofing, heritage metal roofing, and air treatment, heat recovery and exhaust system ducts

3. Draw up the materials list.
    - Main types of prefabricated metal objects
    - Main metal wall coverings
    - Main types of prefabricated and heritage metal roofing
    - Main devices, accessories and air treatment, heat recovery and exhaust system ducts
    - Main fasteners, starting parts and finishing parts, and main sealants and cleaners
    - Calculation of linear quantities and surface areas

Using Access Equipment	Code: 802824

Competency 15 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	**Achievement Context**
Use access equipment.	• Given instructions and scaffolding plans • Using access equipment: ladder, scaffolding parts, boom lift, scissors lift • Using personal and collective safety gear

Elements of the Competency	**Performance Criteria**
1. Plan the work.	• Accurate interpretation of instructions • Appropriate choice of type of access equipment
2. Establish a safety perimeter.	• Identification of all potential obstacles and hazards in the work area • Proper use of personal and collective safety gear
3. Prepare the location of the access equipment.	• Proper clearing of area • Identification of signs of ground subsidence • Appropriate preparation of base • Appropriate choice and positioning of chocks
4. Use a ladder.	• Appropriate choice of type of ladder • Appropriate setup of ladder • Methodical technique for climbing up and down
5. Assemble and disassemble scaffolding.	• Accurate interpretation of the scaffolding plan • Proper establishment of list of necessary scaffolding elements • Appropriate alignment and levelling of scaffolding elements • Proper installation of anchors • Proper installation of means of access • Effective coordination of work with other team members • Systematic inspection of scaffolding during and after installation • Compliance with assembly and disassembly operations and procedures

6. Use a boom lift and a scissors lift.	• Systematic inspection of the mechanical elements of the boom lift or scissors lift • Systematic inspection of the boom lift's or scissors lift's safety devices • Appropriate use of controls • Precise manoeuvres in compliance with manufacturer's standards • Appropriate positioning of boom lift or scissors lift • Compliance with start-up and shutdown procedures
7. Finish the job.	• Proper cleaning of access equipment • Proper storage of access equipment • Cleanliness of work area
	For the competency as a whole: • Adoption of cautious attitudes and behaviours • Compliance with instructions • Compliance with load capacities • Compliance with current standards • 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. Plan the work.
   - Choice of type of access equipment based on height, span, space, etc.

2. Establish a safety perimeter.
   - Sources of risk (fall, power lines, wind, etc.), potential obstacles and hazards in the work area: confined space, enclosed space, clutter, etc.
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, cones, flagging tape, signs, etc.

3. Prepare the location of the access equipment.
   - Load bearing capacity of the type of ground
   - Choice of location based on aerial obstacles, clutter, etc.
   - Types of bases and chocks

4. Use a ladder.
   - Types of ladders: single ladder, extension ladder, step ladder, etc.
   - Features and uses: height, materials and accessories

- Inspection of ladder
- Positioning, techniques and manufacturer's standards

5. Assemble and disassemble scaffolding.
   - Types of scaffolding and components: metal frame scaffolding, ringlock scaffolding
   - Assembly plan, assembly and disassembly procedures
   - Use of cables and tying of knots
   - Installation of accesses (stairs, landings and protective devices)
   - Anchoring and bracing methods
   - Inspection of the installation and its various components
   - Moving mobile scaffolding

6. Use a boom lift and a scissors lift.
   - Features and uses of a boom lift and a scissors lift
   - Inspection and verification of hydraulic components, cables, etc.
   - Range, positioning, operating techniques and manufacturer's standards

7. Finish the job.
   - Importance of cleanliness and tidiness

Installing Anchors and Suspension Devices	Code: 802834

Competency 16 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	**Achievement Context**
Install anchors and suspension devices.	• Given instructions • Given seismic standards • Using measuring instruments: measuring tape, squares, plumb line, laser and spirit levels, laser alignment tool, etc. • Using cutting tools • Using fastening tools: drills, screwdrivers, stud gun, impact hammer, etc. • Using different types of anchors and suspension devices • Using personal and collective safety gear

Elements of the Competency	**Performance Criteria**
1. Plan the installation.	• Accurate interpretation of instructions • Accurate interpretation of seismic standards • Proper selection of type of anchor and suspension device • Proper use of personal and collective safety gear
2. Perform levelling and alignment operations.	• Accurate interpretation of measuring instrument readings • Precise scribing
3. Fasten anchors to different types of surfaces.	• Precise drilling of the necessary holes • Appropriate use of anchoring method • Compliance with requirements with respect to the use of the stud gun • Solid assembly
4. Fasten the suspension.	• Appropriate length of rods and supports • Precise adjustment of heights • Solid suspensions
5. Finish the job.	• Instruments and tools properly put away • Cleanliness of work area

For the competency as a whole:

- Appropriate choice and use of measuring instruments and tools
- Compliance with instructions
- Compliance with seismic standards
- 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. Plan the installation.
   - Installation instructions: distances, heights, types of anchors, surfaces, etc.
   - Seismic standards: building code, level of seismic protection (depending on the region, type of building, etc.), special provisions for tinsmithing work, etc.
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, etc.

2. Perform levelling and alignment operations.
   - Use of measuring tape, squares, plumb line, laser and spirit levels, laser alignment tools, etc.
   - Measuring instrument readings at various starting points
   - Importance of precise scribing

3. Fasten anchors to different types of surfaces.
   - Types of surfaces: concrete, wood, metal, drywall, etc.
   - Types of anchors: mechanical expansion anchors, quick-release anchors, beam anchors, bolt anchors, clamp anchors, screw-in anchors, crimp anchors, stud gun anchors, etc.
   - Fastening tools and safety instructions: drill, screwdriver, stud gun, impact hammer, etc.

4. Fasten the suspension devices.
   - Suspension devices: threaded or unthreaded rods, supports, braces, seismic protection, etc.
   - Adjustment of heights based on instructions

5. Finish the job.
   - Importance of cleanliness and tidiness

Handling and Hoisting Operations	Code: 802843

Competency 17 Duration 45 hours Credits 3

Behavioural Competency

Statement of the Competency	**Achievement Context**
Perform handling and hoisting operations.	• Given plans and hoisting procedures • Given instructions • Using handling and hoisting equipment: winches, hoists and manually operated lifts • Using handling and hoisting accessories: slings, jacks, roller guides, track shoes, shackles, etc. • Working with crane operators • Using personal and collective safety gear

Elements of the Competency	**Performance Criteria**
1. Plan the handling and hoisting operations.	• Accurate interpretation of plans and hoisting procedures • Accurate interpretation of instructions • Appropriate choice of handling and hoisting equipment • Appropriate determination of pathway
2. Establish a safety perimeter.	• Identification of all potential obstacles and hazards in the work area • Proper use of personal and collective safety gear
3. Sling parts.	• Appropriate use of formulas for calculating sling tension • Correct load estimate • Appropriate choice of accessories, slings or steel cables • Thorough inspection of accessories, slings or steel cables • Appropriate choice and use of fastening methods • Appropriate choice and tying of knots
4. Move parts on a vertical, horizontal or inclined plane, alone or with others.	• Appropriate use of reeving techniques • Appropriate use of hoists or winches • Appropriate use of hoisting signals • Compliance with techniques for moving loads

5. Finish the job.	• Proper cleaning of handling and hoisting equipment and accessories • Handling and hoisting accessories properly put away • Cleanliness of work area
	For the competency as a whole:
	• Adoption of cautious attitudes and behaviours • Appropriate determination of centres of gravity • Appropriate use of hoisting charts • Appropriate use of handling and hoisting accessories • Effective coordination of work with other team members • Integrity of materials and components • Compliance with instructions • Compliance with load capacities • 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. Plan the handling and hoisting operations.
   - Characteristics of plans, procedures and hoisting operations
   - Choice of type of handling and hoisting equipment based on load, height, span, available space, etc.
   - Determination of pathways based on the layout of the area and the availability of tools and equipment

2. Establish a safety perimeter.
   - Sources of risk (fall, power lines, wind, etc.), potential obstacles and hazards in the work area: confined space, enclosed space, clutter, etc.
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, cones, flagging tape, signs, etc.

3. Sling parts.
   - Calculation of sling tension: use of trigonometry, the rule of three, geometry and dimensions (volume and area), conversion of units of measure, etc.
   - Characteristics and properties of slings: steel and synthetic cables
   - Characteristics and properties of cables made of natural fibres and cables made of synthetic fibres
   - Characteristics of accessories: eyes, pulleys, shackles, spreader beams, tensioners, etc.

- Inspection and verification of accessories, slings and steel cables: tears, fraying, wear, distortion, cracks, etc.
- Tie-down methods depending on the load: vertical, basket, choke, multi-sling, etc.
- Types of knots: bowline, half hitch, double sheet bend, magnus hitch, etc.

4. Move parts on a vertical, horizontal or inclined plane, alone or with others.
   - Characteristics of square and symmetrical reeving: number of strands and strength ratio
   - Hoisting capacity of winches, hoists and manually operated lifts
   - Standardized and non-conventional hoisting signals
   - Determination of techniques for moving loads based on centre of gravity, area layout, pathways, availability of tools and equipment, etc.
   - Lever effect, safety factors, etc.

5. Finish the job.
   - Importance of cleanliness and tidiness

Installing Prefabricated Metal Objects	Code: 802854

Competency 18 Duration 60 hours Credits 4

Behavioural Competency

Statement of the Competency	**Achievement Context**
Install prefabricated metal objects.	• Given fireplace inserts, cold rooms, hoods, lockers, cupboards, laundry chutes, etc. • Given installation plans and specifications • Using measuring and scribing instruments • Using fasteners • Using hand and portable tools • Using fabrication and assembly equipment: cutting and shaping machine tools, tools for shaping mechanical joints and welding equipment • Using personal and collective safety gear
Elements of the Competency	**Performance Criteria**
1. Plan the installation.	• Accurate interpretation of installation plans and specifications • Proper determination of the specific requirements of the job • Appropriate choice of tools and equipment
2. Help set up the site.	• Proper preparation of work area • Proper preparation of tools and equipment • Proper use of personal and collective safety gear • Appropriate reception of material
3. Prepare the object for installation.	• Precise measurement of object and location • Assembly of object in compliance with requirements • Appropriate and precise modifications made to object
4. Install the object.	• Precise fastening of anchors, suspension devices or supports • Precise positioning of object • Proper fastening of object by welding or using mechanical joints

5. Finish the job.	• Appropriate adjustments • Compliance with polishing requirements • Compliance with sealing requirements
6. Help strike the site.	• Instruments, tools and equipment properly put away • Proper removal of safety perimeters • Proper cleaning of work area
	For the competency as a whole:
	• Appropriate choice and use of measuring and scribing instruments • Appropriate use of tools and equipment • Effective coordination with the various trades • Appropriate handling of equipment and materials • Work in compliance with plans and specifications • 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. Plan the installation.
   - Characteristics of the different prefabricated objects: fireplace inserts, cold rooms, hoods, lockers, cupboards, laundry chutes, etc.
   - Interpretation of installation plans and specifications and establishment of materials list (see competencies 2 and 14)
   - Specific requirements associated with the installation of the object and choice of tools and equipment based on type of object, plans and instructions

2. Help set up the site.
   - Preparation of work area based on construction requirements, priorities and progress of the work
   - Preparation of tools and equipment (see competencies 4, 6, 8, 9, 10, 11, 16 and 17)
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, cones, flagging tape, signs, etc.
   - Reception and inspection of material

3. Prepare the object for installation.
   - Assembly of object in compliance with manufacturer’s requirements
   - Use of tools and modifications to object based on need and location (see competencies 4, 8 and 14)

4. Install the object.
   - Fastening of anchors, suspension devices or supports (see competency 16)
   - Fastening of the part's elements using mechanical joints or welding (see competencies 6, 9, 10 and 11)

5. Finish the job.
   - Possible adjustments: level, tolerances, etc.
   - Surface polishing or finishing (see competencies 4, 6, 9 and 11)
   - Use of sealants based on fabrication requirements

6. Help strike the site.
   - Importance of cleanliness and tidiness

Installing Metal Wall Coverings	Code: 802865

Competency 19 Duration 75 hours Credits 5

Behavioural Competency

Statement of the Competency	**Achievement Context**
Install metal wall coverings.	• Given installation plans and specifications • Given corrugated sheet metal, architectural panels, spandrel panels, modular panels, siding, etc. • Given base sheets, supporting sheets, supports or furring, thermal breaks, mouldings, decorative elements and fasteners • Using measuring and scribing instruments • Using access, handling and hoisting equipment • Using hand and portable tools • Using fabrication and assembly equipment: cutting and shaping machine tools and tools for shaping mechanical joints • Using personal and collective safety gear
Elements of the Competency	**Performance Criteria**
1. Plan the installation.	• Accurate interpretation of installation plans and specifications • Accurate interpretation of the technical characteristics of the frame • Proper determination of the specific requirements of the job • Proper determination of starting point • Appropriate choice of tools and equipment
2. Help set up the site.	• Proper preparation of work area • Proper preparation of tools and equipment • Proper use of personal and collective safety gear • Appropriate reception of material
3. Prepare the installation.	• Fastening of base sheets in compliance with installation method • Fastening of support sheets, supports or furring in compliance with installation method • Proper fastening of thermal breaks • Compliance with interior insulation requirements • Proper preparation and fastening of mouldings

4. Install the wall coverings.	• Proper cutting of wall coverings • Precise alignment of wall coverings • Fastening of wall coverings using mechanical joints or anchors
5. Finish the job.	• Proper preparation of mouldings and decorative elements • Proper fastening of mouldings and decorative elements using mechanical joints or anchors • Compliance with sealing requirements
6. Help strike the site.	• Instruments, tools and equipment properly put away • Proper removal of safety perimeters • Proper cleaning of work area
	For the competency as a whole: • Appropriate choice and use of measuring and scribing instruments • Appropriate use of tools and equipment • Appropriate choice and execution of handling and hoisting techniques • Effective coordination with the various trades • Appropriate handling of equipment and materials • Work in compliance with plans and specifications • 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. Plan the installation.
   - Characteristics of the wall coverings: insulated or non-insulated, corrugated sheet metal, architectural panels, spandrel panels, modular panels, siding, etc.
   - Interpretation of installation plans and specifications and establishment of materials list (see competencies 2 and 14)
   - Specific requirements associated with the installation of the wall coverings, determination of starting point and choice of tools and equipment based on plans and instructions

2. Help set up the site.
    - Preparation of work area based on construction requirements, priorities and progress of the work
    - Preparation of tools and equipment (see competencies 4, 8, 10, 15, 16 and 17)
    - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, cones, flagging tape, signs, etc.
    - Reception and inspection of material

3. Prepare the installation.
    - Installation methods: using mechanical joints and anchors (see competencies 10 and 16)
    - Importance of thermal breaks
    - Types of interior insulation: vapour barrier, air barrier, insulation in rolls, rigid insulation, etc.
    - Baseboards, crown mouldings and casings

4. Install the wall coverings.
    - Cutting of wall coverings (see competencies 4 and 8)
    - Installation methods: using mechanical joints and anchors (see competencies 10 and 16)

5. Finish the job.
    - Cutting and shaping of mouldings and decorative elements (see competencies 4 and 8)
    - Installation methods: using mechanical joints and anchors (see competencies 10 and 16)

6. Help strike the site.
    - Importance of cleanliness and tidiness

Installing Prefabricated Metal Roofing	Code: 802876

Competency 20 Duration 90 hours Credits 6

Behavioural Competency

Statement of the Competency	**Achievement Context**
Install prefabricated metal roofing.	• Given installation plans and specifications • Given prefabricated corrugated panels, embossed panels, sheet metal shingles, etc. • Using flashing, furring, base mouldings and finishing elements • Using measuring and scribing instruments • Using access, handling and hoisting equipment • Using hand and portable tools • Using cutting and shaping machine tools and tools for shaping mechanical joints • Using personal and collective safety gear

Elements of the Competency	**Performance Criteria**
1. Plan the roofing job.	• Accurate interpretation of installation plans and specifications • Proper determination of the specific requirements of the job • Proper determination of starting point • Appropriate choice of tools and equipment
2. Help set up the site.	• Proper preparation of work area • Proper preparation of tools and equipment • Proper use of personal and collective safety gear • Appropriate reception of material
3. Prepare the roof.	• Complete removal of existing roofing • Precise scribing of reference lines • Proper fastening of furring • Proper fastening of base mouldings • Proper shaping and fastening of flashing and corners
4. Install the roofing.	• Proper cutting of roofing • Precise alignment of roofing • Assembly of roofing in compliance with installation method

5. Finish the roof.	• Proper fastening of peak • Proper fastening of decorative elements, mouldings and fascia • Proper fastening of soffit • Proper shaping and fastening of gutters and drains • Proper execution of watertightness test
6. Help strike the site.	• Instruments, tools and equipment properly put away • Proper removal of safety perimeters • Proper cleaning of work area
	For the competency as a whole: • Appropriate choice and use of measuring and scribing instruments • Appropriate use of tools and equipment • Appropriate choice and execution of handling and hoisting techniques • Effective coordination with the various trades • Appropriate handling of equipment and materials • Work in compliance with plans and specifications • Watertight roof • Compliance with sealing requirements • 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. Plan the roofing job.
   - Slopes, characteristics of pitched roofs and cladding, roofs with and without decking, attic ventilation, etc.
   - Characteristics of roofing: prefabricated corrugated panels, embossed panels, sheet metal shingles, etc.
   - Interpretation of installation plans and specifications and establishment of materials list (see competencies 2 and 14)
   - Specific requirements associated with the installation of the roofing, determination of starting point and choice of tools and equipment based on plans and instructions

2. Help set up the site.
   - Preparation of work area based on construction requirements, priorities and progress of the work

- Preparation of tools and equipment (see competencies 4, 8, 10, 15 and 17)
- Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, cones, flagging tape, signs, etc.
- Reception and inspection of material

3. Prepare the roof.
   - Removal of materials to be replaced in compliance with requirements
   - Condition of decking: humidity, mould, deterioration, etc.
   - Cleaning and drying of decking
   - Shaping of flashing and corners (see competencies 4 and 8)
   - Mechanical fastening of flashing, furring and base mouldings in compliance with manufacturer's requirements

4. Install the roofing.
   - Cutting of roofing (see competencies 4 and 8)
   - Assembly and mechanical fastening of roofing in compliance with manufacturer's requirements: direction, overlap, etc.

5. Finish the roof.
   - Mechanical fastening of peak, decorative elements, mouldings and fascia in compliance with manufacturer's requirements
   - Shaping of gutters and drains using a roll former or bender
   - Mechanical fastening of gutters, drains and soffit in compliance with installation requirements

6. Help strike the site.
   - Importance of cleanliness and tidiness

Heritage Roofing	Code: 802887

Competency 21 Duration 105 hours Credits 7

Behavioural Competency

Statement of the Competency

Cover heritage roofs using traditional metal or similar materials.

Achievement Context

- Given installation plans and specifications
- Given ancestral sheet metal, sheet metal with rods or clamps, or pinched sheet metal
- Using flashing, corners, base mouldings, self-adhesive protective eaves membrane, felt or synthetic paper, finishing elements and fasteners
- Using measuring and scribing instruments
- Using access, handling and hoisting equipment
- Using hand and portable tools
- Using fabrication and assembly equipment: cutting and shaping machine tools, tools for shaping mechanical joints and soldering equipment
- Using personal and collective safety gear

Elements of the Competency	Performance Criteria
1. Plan the roofing job.	• Accurate interpretation of installation plans and specifications • Proper determination of the specific requirements of the job • Proper determination of starting point • Appropriate choice of tools and equipment
2. Help prepare the site.	• Proper preparation of work area • Proper preparation of tools and equipment • Proper use of personal and collective safety gear • Appropriate reception of material
3. Prepare the roof.	• Complete removal of existing roofing • Precise scribing of reference lines • Proper shaping and fastening of flashing and corners • Proper fastening of base mouldings • Proper fastening of self-adhesive protective eaves membrane or felt or synthetic paper

4. Install the sheet metal.	• Proper preparation of sheets • Precise alignment of sheets • Proper shaping of mechanical joints • Assembly of sheet metal in compliance with installation method
5. Finish the roof.	• Proper preparation of finishing elements • Proper fastening or tipping-up of peak • Proper fastening of decorative elements, mouldings and soffits • Proper fastening of soffit • Proper shaping and fastening of gutters and drains • Proper execution of watertightness test
6. Help strike the site.	• Instruments, tools and equipment properly put away • Proper removal of safety perimeters • Proper cleaning of work area
	For the competency as a whole: • Appropriate choice and use of measuring and scribing instruments • Appropriate use of tools and equipment • Appropriate choice and execution of handling and hoisting techniques • Effective coordination with the various trades • Appropriate handling of equipment and materials • Work in compliance with plans and specifications • Appropriate use of soldering techniques • Watertight roof • Compliance with sealing requirements • Respect for the artisanal character of the work • 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. Plan the roofing job.
    - Slopes, characteristics of heritage roofs and cladding, attic ventilation, etc.
    - Characteristics of ancestral sheet metal, sheet metal with rods or clamps and pinched sheet metal

- Interpretation of installation plans and specifications and establishment of materials list (see competencies 2 and 14)
- Specific requirements associated with the installation of the roofing, determination of starting point and choice of tools and equipment based on plans and instructions

2. Help set up the site.
   - Preparation of work area based on construction requirements, priorities and progress of the work
   - Preparation of tools and equipment (see competencies 4, 8, 10, 15 and 17)
   - Preparation of soldering nozzles, soldering irons, soldering furnaces, cleaners, etc.
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, cones, flagging tape, signs, etc.
   - Reception and inspection of material

3. Prepare the roof.
   - Removal of materials to be replaced in compliance with requirements
   - Condition of decking: humidity, mould, deterioration, etc.
   - Cleaning and drying of decking
   - Shaping of flashing and corners (see competencies 4 and 8)
   - Mechanical fastening of flashing and base mouldings in compliance with manufacturer's requirements
   - Function of self-adhesive protective eaves membrane or felt or synthetic paper and installation requirements

4. Install the sheet metal.
   - Cutting and shaping of sheet metal (see competencies 4 and 8)
   - Shaping of mechanical joints (see competency 10)
   - Assembly and mechanical fastening of sheet metal and characteristics of the roof
   - Soldering techniques: surface preparation, application of tin to the various joints, etc.

5. Finish the roof.
   - Cutting and shaping of finishing elements (see competencies 4, 7 and 8)
   - Mechanical fastening or tipping-up in compliance with installation requirements
   - Mechanical fastening of decorative elements, mouldings and fascia in compliance with installation requirements
   - Shaping of gutters and drains using roll former or bender
   - Mechanical fastening of gutters, drains and soffit in compliance with installation requirements
   - Soldering techniques: surface preparation, application of tin to the various joints, etc.

6. Help strike the site.
   - Importance of cleanliness and tidiness

Installing Rectangular Air Treatment, Heat Recovery and Exhaust Systems	Code: 802895

Competency 22 Duration 75 hours Credits 5

Behavioural Competency

Statement of the Competency

Install rectangular air treatment, heat recovery and exhaust systems.

Achievement Context

- Given installation plans and specifications
- Using rectangular ducts
- Using devices and accessories: fans, roof and ceiling ventilators, caps, humidifiers, dehumidifiers, dampers, fire stops, prefabricated bases, scrim, louvers, grilles, sound attenuators, diffusers, vibration isolators, etc.
- Using fasteners
- Using measuring and scribing instruments
- Using access, handling and hoisting equipment
- Using hand and portable tools
- Using fabrication and assembly equipment: cutting and shaping machine tools, tools for shaping mechanical joints and welding equipment
- Using air measuring instruments
- Using personal and collective safety gear

Elements of the Competency	Performance Criteria
1. Plan the installation.	• Accurate interpretation of installation plans and specifications • Proper determination of the specific requirements of the job • Proper determination of starting point • Appropriate choice of tools and equipment
2. Help prepare the site.	• Proper preparation of work area • Proper preparation of tools and equipment • Proper use of personal and collective safety gear • Appropriate reception of material
3. Install the devices and accessories.	• Proper positioning of devices and accessories • Proper fastening of devices and accessories • Correct height and levelness of devices and accessories • Proper adjustment of vibration isolators • Compliance with sealing requirements

4. Preassemble the elements of the system.	• Selection of appropriate elements • Proper positioning of elements • Preparation of ducts in compliance with installation requirements • Proper fastening of elements using welding or mechanical joints • Solid subassembly
5. Mount the subassemblies.	• Proper positioning of subassemblies • Proper fastening of branch fittings • Shaping of missing parts in compliance with installation requirements • Proper pre-adjustment of devices or accessories • Proper fastening of subassemblies using welding or mechanical joints • Proper height and levelness of system
6. Participate in the testing and adjustment of the system.	• Active participation in the pressure and smoke tests • Complete plugging of leaks • Active participation in system start-up • Appropriate use of air meters • Active participation in the adjustment of devices or accessories
7. Help strike the site.	• Instruments, tools and equipment properly put away • Proper removal of safety perimeters • Proper cleaning of work area
	For the competency as a whole: • Appropriate choice and use of measuring and scribing instruments • Appropriate use of tools and equipment • Proper installation of anchors and mounts • Appropriate choice and execution of handling and hoisting techniques • Effective coordination with the various trades • Appropriate handling of equipment and materials • Positioning and fastening of insulation in compliance with requirements • Work in compliance with plans and specifications • Compliance with sealing requirements • Compliance with seismic standards

- 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. Plan the installation.
   - Functioning of air treatment, heat recovery and exhaust systems and main applications in the construction sector
   - Principles of ventilation, standards, units of measure, etc.
   - Interpretation of installation plans and specifications and establishment of materials list (see competencies 2 and 14)
   - Specific requirements associated with the installation of the system, determination of starting point and choice of tools and equipment based on plans and instructions

2. Help set up the site.
   - Preparation of work area based on construction requirements, priorities and progress of the work
   - Preparation of tools and equipment (see competencies 4, 5, 6, 8, 9, 10, 11, 15, 16 and 17)
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, cones, flagging tape, signs, etc.
   - Reception and inspection of material

3. Install the devices and accessories.
   - Role and functioning of devices and accessories: vibration isolators, fans, roof and ceiling ventilators, caps, humidifiers, dehumidifiers, dampers, fire stops, prefabricated bases, scrim, louvers, grilles, sound attenuators, diffusers, etc.
   - Installation of anchors and mounts (see competency 16)
   - Positioning, sealing and fastening of devices and accessories based on plans, standards or specifications

4. Preassemble the elements of the system.
   - Selection and positioning of elements of the system based on plans, standards or specifications
   - Preparation of ducts (see competencies 4 and 10)
   - Fastening of the elements of the systems using mechanical joints or welding (see competencies 6, 9, 10 and 11)

5. Mount the subassemblies.
   - Installation of anchors and suspension devices (see competency 16)
   - Positioning of subassemblies based on plans, standards or specifications
   - Shaping of missing parts, if applicable (see competencies 3, 4, 5, 7 and 8)
   - Pre-adjustment of devices or accessories in open position
   - Fastening of the elements of the systems using mechanical joints or welding (see competencies 6, 9, 10 and 11)

6. Participate in the testing and adjustment of the system.
   - Air measuring instruments: thermometer, anemometer, etc.
   - Adjustment of devices or accessories in compliance with requirements and operating standards

7. Help strike the site.
   - Importance of cleanliness and tidiness

Installing Cylindrical Air Treatment, Heat Recovery and Exhaust Systems	Code: 802905

Competency 23 Duration 75 hours Credits 5

Behavioural Competency

Statement of the Competency

Install cylindrical air treatment, heat recovery and exhaust systems.

Achievement Context

- Given installation plans and specifications
- Using cylindrical ducts
- Using devices and accessories: fans, roof and ceiling ventilators, caps, humidifiers, dehumidifiers, dampers, fire stops, prefabricated bases, scrim, louvers, grilles, sound attenuators, diffusers, etc.
- Using fasteners
- Using measuring and scribing instruments
- Using access, handling and hoisting equipment
- Using hand and portable tools
- Using fabrication and assembly equipment: cutting and shaping machine tools, tools for shaping mechanical joints and welding equipment
- Using air measuring devices
- Using personal and collective safety gear

Elements of the Competency	Performance Criteria
1. Plan the installation.	• Accurate interpretation of installation plans and specifications • Proper determination of the specific requirements of the job • Proper determination of starting point • Appropriate choice of tools and equipment
2. Help set up the site.	• Proper preparation of work area • Proper preparation of tools and equipment • Proper use of personal and collective safety gear • Appropriate reception of material
3. Install the devices and accessories.	• Proper positioning of devices and accessories • Proper fastening of devices and accessories • Correct height and levelness of devices and accessories • Proper adjustment of vibration isolators • Compliance with sealing requirements

4. Preassemble the elements of the system.	• Selection of appropriate elements • Proper positioning of elements • Preparation of ducts in compliance with installation requirements • Proper fastening of elements using welding or mechanical joints • Solid subassembly
5. Mount the subassemblies.	• Proper positioning of subassemblies • Proper fastening of branch fittings • Shaping of missing parts in compliance with installation requirements • Proper pre-adjustment of devices or accessories • Proper fastening of subassemblies using welding or mechanical joints • Proper height and levelness of system
6. Participate in the testing and adjustment of the system.	• Active participation in the pressure and smoke tests • Complete plugging of leaks • Active participation in system start-up • Appropriate use of air measuring instruments • Active participation in the adjustment of devices or accessories
7. Help strike the site.	• Instruments, tools and equipment properly put away • Proper removal of safety perimeters • Proper cleaning of work area
	For the competency as a whole: • Appropriate choice and use of measuring and scribing instruments • Appropriate use of tools and equipment • Proper installation of anchors and suspension devices • Appropriate choice and execution of handling and hoisting techniques • Effective coordination with the various trades • Appropriate handling of equipment and materials • Positioning and fastening of insulation in compliance with requirements • Work in compliance with plans and specifications • Compliance with sealing requirements

- Compliance with seismic standards
- 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. Plan the installation.
   - Functioning of air treatment, heat recovery and exhaust systems and main applications in the construction sector
   - Principles of ventilation, standards, units of measure, etc.
   - Interpretation of installation plans and specifications and establishment of materials list (see competencies 2 and 14)
   - Specific requirements associated with the installation of the system, determination of starting point and choice of tools and equipment based on plans and instructions

2. Help set up the site.
   - Preparation of work area based on construction requirements, priorities and progress of the work
   - Preparation of tools and equipment (see competencies 4, 5, 7, 8, 9, 10, 11, 15, 16 and 18)
   - Personal and collective safety gear: hard hat, boots, glasses, mask, visor, gloves, protectors, guides, screens, cones, flagging tape, signs, etc.
   - Reception and inspection of material

3. Install the devices and accessories.
   - Role and functioning of devices and accessories: vibration isolators, fans, roof and ceiling ventilators, caps, humidifiers, dehumidifiers, dampers, fire stops, prefabricated bases, scrim, louvers, grilles, sound attenuators, diffusers, etc.
   - Installation of anchors and mounts (see competency 16)
   - Positioning, sealing and fastening of devices and accessories based on plans, standards or specifications

4. Preassemble the elements of the system.
   - Selection and positioning of elements of the system based on plans, standards or specifications
   - Preparation of ducts (see competencies 4 and 10)
   - Fastening of the elements of the systems using mechanical joints or welding (see competencies 6, 9, 10 and 11)

5. Mount the subassemblies.
   - Installation of anchors and suspension devices (see competency 16)
   - Positioning of subassemblies based on plans, standards or specifications
   - Shaping of missing parts, if applicable (see competencies 3, 4, 5, 7 and 8)
   - Pre-adjustment of devices or accessories in open position
   - Fastening of the elements of the systems using mechanical joints or welding (see competencies 6, 9, 10 and 11)

6. Participate in the testing and adjustment of the system.
   - Air measuring instruments: thermometer, anemometer, etc.
   - Adjustment of devices or accessories in compliance with requirements and operating standards

7. Help strike the site.
   - Importance of cleanliness and tidiness

Construction Industry Organizations	Code: 754991

Competency 24 Duration 15 hours Credit 1

Situational Competency

Statement of the Competency

Learn about construction industry organizations.

Elements of the Competency

- Learn about the construction industry.
- Learn about the role of the organizations in the industry and their importance.
- Understand the reality of labour relations in the industry.

Learning Context

Information Phase

- Learning about the construction industry
- Learning about the roles and responsibilities of construction industry organizations (employer associations, unions, CCQ, CNESST, etc.)
- Learning about labour relations in the construction industry

Participation Phase

- Participating in activities allowing them to gain an understanding of:
  - the evolution of the construction industry and future prospects
  - the interdependence of the different trades and occupations
  - the effects of regulation on the work system in the industry
- Exploring the possibility of ongoing professional development in the industry.

Synthesis Phase

- Presenting a report that contains a summary of what they have learned and an assessment of the impact of this learning on their career choice

Instructional Guidelines

- Provide the necessary information sources
- Make extensive use of learning situations that reflect the reality of the construction industry
- Foster discussions and encourage all students to participate
- Help the students write their summary using tools such as questionnaires

Participation Criteria

Information Phase

- Consult the sources of information made available to them

Participation Phase

- Participate in all the suggested activities and take them seriously

Synthesis Phase

- Present a report that contains a summary of what they have learned and an assessment of the impact of this learning on their career choice

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.

Information Phase

- Characteristics and economic importance of the construction industry
- Roles and responsibilities of employer associations: Association de la construction du Québec, Association des constructeurs de routes et grands travaux du Québec, Association des entrepreneurs en construction du Québec, Association provinciale des constructeurs d'habitations du Québec, Corporation des maîtres électriciens du Québec and Corporation des maîtres mécaniciens en tuyauterie du Québec
- Roles and responsibilities of unions: Fédération des travailleurs du Québec, Conseil provincial du Québec des métiers de la construction, Centrale des syndicats démocratiques, Confédération des syndicats nationaux and Syndicat québécois de la construction
- Roles and responsibilities of the Commission des relations de travail: structure, sections, functions and powers with respect to the construction industry
- Roles and responsibilities of the Régie du bâtiment du Québec: structure, sections, functions and powers
- Roles and responsibilities of the Commission de la construction du Québec: structure, sections, functions and powers
- Roles and responsibilities of occupational health and safety organizations, CNESST and Association sectorielle paritaire: structure, sections, functions and powers

Participation Phase

- Importance of sharing their point of view with colleagues: attitude with respect to differing points of view and usefulness in the practice of the trade
- Characteristics of trades and occupations and differences between them
- Characteristics of sectoral collective agreements and differences between them: residential, institutional and commercial, industrial, civil engineering and road works
- Laws and regulations governing labour relations in the construction industry
- Reasons for these laws and regulations and their impact on working conditions: *Act respecting labour relations, vocational training and workforce management in the construction industry* (CQLR c. R-20), *Regulation respecting the vocational training of the workforce in the construction industry, Regulation respecting complementary social benefit plans in the construction industry*
- Benefits of training funds: Fonds de formation des travailleurs de l'industrie de la construction, Plan de formation des travailleurs du secteur résidentiel

Job Search Techniques	Code: 802911

Competency 25 Duration 15 hours Credit 1

Behavioural Competency

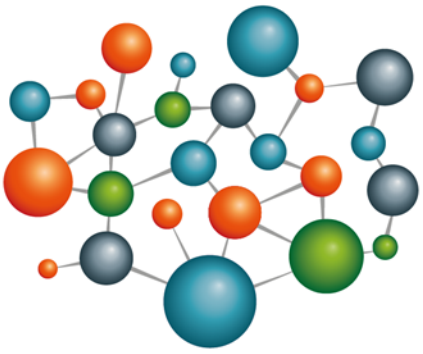
Statement of the Competency	**Achievement Context**
Use job search techniques.	• Using a computer
Elements of the Competency	**Performance Criteria**
1. Write a resumé.	• Relevance of information included • Comprehensive, accurate information
2. Write a job application letter.	• Determination of an acceptable number of potential employers • Text appropriate for the job sought • Appropriate highlighting of qualifications and interest in the job
	For the competency as a whole: • Quality of written communication • Demonstration of honesty and objectivity • Compliance with presentation standards

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. Elements of the Competency
   - Content of a resumé: personal information, education, work experience, achievements, competencies, etc.
   - Importance of the quality of language and the use of a spell checker

2. Elements of the Competency
   - Search for potential employers by sector of activity and according to personal interest
   - Content of a letter of application: additional information, highlighting of job-related competencies, explanation of qualifications, request for an interview, thanks and signature
   - General rules of presentation: lively style, short sentences and paragraphs, etc.



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