



ROOFER

2014

Based on a New Brunswick | Nova Scotia Collaboration
pg. 9 for Program Structure



Preface

This Curriculum Standard is intended to assist instructional staff in the design and delivery of technical, in-class training in support of the Roofer program.

This document contains all the technical training elements required to complete the Roofer apprenticeship program and has been developed based on the 2012 National Occupational Analysis (NOA). The NOA can be found on the Red Seal website (www.red-seal.ca).

This Curriculum Standard will be amended periodically; comments or suggestions for improvements should be directed to:

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Acknowledgements

The Province wishes to acknowledge the contributions of the following industry and instructional representatives who participated in the development of this document:

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In addition to the individuals noted above, various government and industry representatives contributed to the development of this document.

Table of Contents

Preface.....	2
Acknowledgements.....	3
Glossary of Terms	5
Essential Skills Profiles	7
Profile Chart	8
Program Structure	9
2012 NOA Sub-task to Curriculum Standard Unit Comparison	10

Program Content

Level 1	14
Level 2	36
Level 3	48
Nova Scotia Document Evaluation Form.....	63

Glossary of Terms

These definitions are intended as a guide to how language is used in the document.

ADJUST	To put in good working order; regulate; bring to a proper state or position.
APPLICATION	The use to which something is put and/or the circumstance in which you would use it.
CHARACTERISTIC	A feature that helps to identify, tell apart, or describe recognizably; a distinguishing mark or trait.
COMPONENT	A part that can be separated from or attached to a system; a segment or unit.
DEFINE	To state the meaning of (a word, phrase, etc.).
DESCRIBE	To give a verbal account of; tell about in detail.
DIAGNOSE	To analyze or identify a problem or malfunction.
EXPLAIN	To make plain or clear; illustrate; rationalize.
IDENTIFY	To point out or name objectives or types.
INTERPRET	To translate information from observation, charts, tables, graphs, and written material.
MAINTAIN	To keep in a condition of good repair or efficiency.
METHOD	A means or manner of doing something that has procedures attached to it.
OPERATE	How an object works; to control or direct the functioning of.
PROCEDURE	A prescribed series of steps taken to accomplish an end.

Glossary of Terms *(continued)*

PURPOSE	The reason for which something exists or is done, made or used.
SERVICE	Routine inspection and replacement of worn or deteriorating parts. An act or business function provided to a customer in the course of one's profession. (e.g., haircut).
TECHNIQUE	Within a procedure, the manner in which technical skills are applied.
TEST	v. To subject to a procedure that ascertains effectiveness, value, proper function, or other quality. n. A way of examining something to determine its characteristics or properties, or to determine whether or not it is working correctly.
TROUBLESHOOT	To follow a systematic procedure to identify and locate a problem or malfunction and its cause.

Essential Skills Profiles

Human Resources and Skills Development Canada (HRSDC) defines Essential Skills as “The skills needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.”

HRSDC has developed Essential Skills profiles which describe how each of the nine Essential Skills are used by workers in an occupation.

These profiles include:

- A brief description of the occupation;
- A list of the most important Essential Skills;
- Examples of tasks that illustrate how each Essential Skill is applied;
- Complexity ratings that indicate the level of difficulty;
- The physical aspects of performing the job and the attitudes that workers feel are needed to do the job well;
- Future trends affecting Essential Skills.

The Essential Skills profiles can be found on the HRSDC website at http://www10.hrsdc.gc.ca/es/english/ES_Profiles.aspx

The development and improvement of these Essential Skills is inherent throughout the apprenticeship training program as apprentices work towards achieving journeyman status.

Profile Chart

COMMON OCCUPATIONAL SKILLS			
RFG-100 Safety	RFG-105 Tools and Equipment	RFG-110 Kettles and Burners	RFG-115 Drawings
RFG-120 Communication and Trade Documentation	RFG-125 Hoisting, Lifting and Rigging	RFG-130 Access Equipment	RFG-145 Planning and Estimating
RFG-205 Mechanical Roofing Equipment	RFG-325 Job Planning		
ROOF PREPARATION			
RFG-140 Introduction to Roof Structures	RFG-210 Roof Deck Preparation		
LOW SLOPE AND FLAT ROOFING			
RFG-220 Low Slope and Flat Roofs	RFG-200 Fasteners, Adhesives, and Sealants	RFG-215 Roof Membrane Systems I	RFG-300 Roof Membrane Systems II
SHINGLES, TILES, AND PRE-FORMED METAL ROOFING			
RFG-135 Roofing Materials	RFG-305 Steep Roofs	RFG-315 Metal Flashings	
WATERPROOFING AND DAMP-PROOFING			
RFG-310 Waterproofing and Damp-proofing			
ROOF MAINTENANCE AND REPAIR			
RFG-320 Roof Maintenance and Repair			

Program Structure – Nova Scotia Apprenticeship Program

The courses listed below are required technical training in the Nova Scotia Roofer Apprenticeship Program.

Unit #	Unit Name	Prerequisites	Sugg. Hrs	Pg #
Level 1 (6 Weeks)				
MENT-1801	Workplace Mentoring I (<i>NS Specific</i>)	None	Through-out	15
RFG-100	Safety		20	16
RFG-105	Tools and Equipment		25	18
RFG-110	Kettles and Burners		20	20
RFG-115	Drawings		20	22
RFG-120	Communication and Trade Documentation		10	24
RFG-125	Hoisting, Lifting and Rigging		15	26
RFG-130	Access Equipment		10	28
RFG-135	Roofing Materials		30	30
RFG-140	Introduction to Roof Structures		15	33
RFG-145	Planning and Estimating		30	34
Level 2 (6 Weeks)				
RFG-200	Fasteners, Adhesives and Sealants	Level 1	30	37
RFG-205	Mechanical Roofing Equipment		15	39
RFG-210	Roof Deck Preparation		60	41
RFG-215	Roof Membrane Systems I		30	43
RFG-220	Low Slope and Flat Roofs		45	45
Level 3 (6 Weeks)				
MENT-1802	Workplace Mentoring II (<i>NS Specific</i>)	Level 2	Through-out	49
RFG-300	Roof Membrane Systems II		30	50
RFG-305	Steep Roofs		30	52
RFG-310	Waterproofing and Damp-Proofing		15	54
RFG-315	Metal Flashings		15	56
RFG-320	Roof Maintenance and Repair		30	58
RFG-325	Job Planning		15	60
RFG-1830	Program Review		30	62
Nova Scotia Roofer Apprenticeship Program: All units must be covered within the Level training.				

2012 NOA Sub-task to Curriculum Standard Unit Comparison

NOA Sub-task		PG Unit	
Task 1 – Performs safety related functions.			
1.01	Uses personal protective equipment (PPE) and safety equipment.	RFG-100	Safety
1.02	Maintains safe work environment	RFG-100	Safety
Task 2 – Maintains and uses tools and equipment.			
2.01	Maintains tools and equipment.	RFG-105	Tools and Equipment
		RFG-110	Kettles and Burners
2.02	Uses hoisting, lifting and rigging equipment.	RFG-125	Hoisting, Lifting and Rigging
2.03	Uses motorized equipment.	RFG-205	Mechanical Roofing Equipment
Task 3 – Perform common work practices and procedures.			
3.01	Interprets blueprints and drawings.	RFG-115	Drawings
		RFG-325	Job Planning
3.02	Estimates material.	RFG-145	Planning and Estimating
		RFG-325	Job Planning
3.03	Assesses worksite conditions.	RFG-145	Planning and Estimating
		RFG-325	Job Planning
3.04	Communicates with others.	RFG-120	Communication and Trade Documentation
		RFG-125	Hoisting, Lifting and Rigging
		RFG-325	Job Planning
3.05	Accesses work area.	RFG-130	Access Equipment
3.06	Positions equipment and material on the ground and on the roof.	RFG-110	Kettles and Burners
		RFG-125	Hoisting, Lifting and Rigging
		RFG-145	Planning and Estimating
		RFG-205	Mechanical Roofing Equipment
3.07	Prepares material disposal system.	RFG-145	Planning and Estimating
Task 4 – Prepares roof for replacement.			
4.01	Protects surrounding area.	RFG-210	Roof Deck Preparation
4.02	Removes loose debris.	RFG-210	Roof Deck Preparation
4.03	Removes roofing and flashing.	RFG-210	Roof Deck Preparation
4.04	Prepares roof substrate.	RFG-210	Roof Deck Preparation
4.05	Performs minor adjustments to penetrations, curbs, and parapets.	RFG-210	Roof Deck Preparation
4.06	Installs water cut-offs, temporary seals, and temporary drains.	RFG-210	Roof Deck Preparation
Task 5 – Prepares deck for roof installation.			
5.01	Inspects deck.	RFG-210	Roof Deck Preparation
5.02	Cleans deck.	RFG-210	Roof Deck Preparation
5.03	Verifies placement of roof penetrations, curbs, and parapets.	RFG-210	Roof Deck Preparation
5.04	Dries deck.	RFG-210	Roof Deck Preparation
Task 6 – Applies roofing components			
6.01	Installs leveling surface	RFG-220	Low Slope and Flat Roofs

NOA Sub-task		PG Unit	
		RFG-200	Fasteners, Adhesives and Sealants
6.02	Primes substrate.	RFG-220	Low Slope and Flat Roofs
6.03	Applies vapour retarder, vapour barrier and air barrier.	RFG-220	Low Slope and Flat Roofs
6.04	Installs insulation.	RFG-220	Low Slope and Flat Roofs
		RFG-200	Fasteners, Adhesives and Sealants
6.05	Installs cover board.	RFG-220	Low Slope and Flat Roofs
6.06	Installs drains, vents, curbs and penetrations.	RFG-220	Low Slope and Flat Roofs
6.07	Applies ballast, walkways, and protective surfaces.	RFG-220	Low Slope and Flat Roofs
6.08	Installs metal flashings.	RFG-220	Low Slope and Flat Roofs
Task 7 – Applies membranes.			
7.01	Relaxes membranes.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
7.02	Sets membranes.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
7.03	Applies membranes using hot-liquid process.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
7.04	Applies membranes using torched-on method.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
7.05	Applies membranes using hot-air welding.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
		RFG-200	Fasteners, Adhesives and Sealants
7.06	Applies membranes using cold process.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
7.07	Applies membranes using mechanical fasteners.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
		RFG-200	Fasteners, Adhesives and Sealants
7.08	Applies loose-laid membranes.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
7.09	Installs membrane flashings.	RFG-215	Roof Membrane Systems I
		RFG-300	Roof Membrane Systems II
Task 8 – Performs common steep slope practices.			
8.01	Installs steep slope underlayment.	RFG-305	Steep Roofs
8.02	Installs attic vent flashings.	RFG-305	Steep Roofs
8.03	Installs valley treatments.	RFG-305	Steep Roofs
8.04	Installs saddles/crickets.	RFG-305	Steep Roofs
8.05	Installs metal flashings for steep slope roofs.	RFG-305	Steep Roofs
		RFG-315	Metal Flashings
Task 9 – Applies shingles.			
9.01	Determines layout of shingles.	RFG-135	Roofing Materials
		RFG-220	Low Slope and Flat Roofs

NOA Sub-task		PG Unit	
9.02	Installs starter strips.	RFG-305	Steep Roofs
		RFG-135	Roofing Materials
		RFG-220	Low Slope and Flat Roofs
9.03	Fastens shingles.	RFG-305	Steep Roofs
		RFG-135	Roofing Materials
		RFG-220	Low Slope and Flat Roofs
9.04	Cuts shingles.	RFG-305	Steep Roofs
		RFG-135	Roofing Materials
		RFG-220	Low Slope and Flat Roofs
9.05	Tabs shingles.	RFG-305	Steep Roofs
		RFG-135	Roofing Materials
		RFG-220	Low Slope and Flat Roofs
Task 10 – Applies roof tiles.			
10.01	Installs strapping.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
10.02	Fastens roof tiles.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
10.03	Cuts roof tiles.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
10.04	Installs closure strips.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
10.05	Seals ridge and hip caps.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
Task 11 – Applies pre-formed metal roofing.			
11.01	Installs strapping for pre-formed metal roofing.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
11.02	Fastens pre-formed metal roofing.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
11.03	Cuts sheet metal	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
11.04	Installs closure strips for pre-formed metal roofing.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
11.05	Installs snow guards.	RFG-220	Low Slope and Flat Roofs
		RFG-305	Steep Roofs
Task 12 – Waterproofs surfaces.			
12.01	Prepares waterproofing substrates	RFG-310	Waterproofing and Damp-proofing
12.02	Applies waterproofing membrane.	RFG-310	Waterproofing and Damp-proofing
12.03	Installs green, sustainable, vegetative and, protected membrane components.	RFG-310	Waterproofing and Damp-proofing

NOA Sub-task		PG Unit	
Task 13 – Damp-proofs surfaces.			
13.01	Applies coatings.	RFG-310	Waterproofing and Damp-proofing
13.02	Applies protection layer.	RFG-310	Waterproofing and Damp-proofing
Task 14 – Assesses roof conditions.			
14.01	Performs roof inspections.	RFG-320	Roof Maintenance and Repair
14.02	Performs cut test.	RFG-320	Roof Maintenance and Repair
14.03	Determines maintenance and repair.	RFG-320	Roof Maintenance and Repair
Task 15 – Maintains and repairs roof.			
15.01	Maintains drains and scrapers.	RFG-320	Roof Maintenance and Repair
15.02	Refills penetration pockets.	RFG-320	Roof Maintenance and Repair
15.03	Replaces deteriorated caulking.	RFG-320	Roof Maintenance and Repair
15.04	Repairs membrane defects.	RFG-320	Roof Maintenance and Repair
15.05	Reapplies surfacing and ballast to bare areas.	RFG-320	Roof Maintenance and Repair
15.06	Repairs steep roofing defects.	RFG-320	Roof Maintenance and Repair
15.07	Re-secures loose metal flashings.	RFG-320	Roof Maintenance and Repair

Level 1

MENT-1801 Workplace Mentoring I
(Nova Scotia Unit of Instruction)

Learning Outcomes:

- Identify and explain strategies for learning workplace skills.
- Demonstrate strategies to assist in learning skills in the workplace.

Objectives and Content:

1. Describe the importance of your own experiences.
2. Identify the partners involved in apprenticeship.
3. Describe the shared responsibilities for workplace learning.
4. Determine your own learning preferences and explain how these relate to learning new skills.
5. Describe the importance of different types of skills in the workplace.
6. Describe the importance of essential skills in the trade.
7. Identify different ways of learning.
8. Identify your learning preferences.
9. Identify different learning needs and strategies to meet learning needs.
10. Identify techniques for effective communication.
11. Identify strategies to assist in learning a skill.

Resource:

- Recommended resource to use in the delivery of this unit:
www.apprenticeship.nsc.ca/mentoring/apprentice.htm

RFG-100 Safety

Learning Outcomes:

- Demonstrate knowledge of safety and personal protective equipment, their applications and procedures for use.
- Demonstrate knowledge of safe work practices.
- Demonstrate knowledge of regulations pertaining to safety.

National Occupational Analysis Reference:

- 1.01 Uses personal protective equipment (PPE) and safety equipment.
- 1.02 Maintains safe work environment.

Suggested Hours

20 hours

Objectives and Content:

1. Identify types of personal protective equipment (PPE) and describe their applications.
 - i) clothing
 - ii) equipment
2. Describe the procedures used to inspect, maintain and store PPE.
3. Identify types of safety equipment and describe their applications.
 - i) warning lines
 - ii) guard rails
 - iii) fire extinguishers
 - iv) first aid kits
4. Describe the procedures used to operate safety equipment.
5. Identify hazards and describe safe work practices and equipment.
 - i) personal
 - falls
 - personal apparel
 - disease
 - burns

- lacerations
 - weather
 - lifting
- ii) workplace
- fire
 - electrical
 - confined space (awareness of)
 - lockout/tag out
 - heights
 - spills
 - faulty equipment
 - debris
 - obstructions
 - hazardous/flammable material
 - weather
 - asbestos
- iii) environmental
6. Identify classes of fire and describe fire control equipment and procedures.
7. Identify and interpret workplace safety and health regulations.
- i) federal
- Occupational Health and Safety Regulations
 - Workplace Hazardous Material Information System (WHMIS)
- ii) provincial
- iii) municipal
8. Describe the procedures used to protect the public and work areas.
- i) warning lines and barricades
- ii) signage
- iii) tarps and protective coverings
9. Describe the importance of good housekeeping practices.

RFG-105 Tools and Equipment

Learning Outcomes:

- Demonstrate knowledge of hand tools, their applications, maintenance and procedures for use.
- Demonstrate knowledge of power tools, their applications, maintenance and procedures for use.
- Demonstrate knowledge of measuring and layout tools and equipment, their applications, maintenance and procedures for use.

National Occupational Analysis Reference:

2.01 Maintains tools and equipment.

Suggested Hours:

25 hours

Objectives and Content:

1. Define terminology associated with roofing tools and equipment.
2. Identify hazards and describe safe working practices pertaining to roofing tools and equipment.
3. Interpret regulations pertaining to tools and equipment.
 - i) training and certification
 - ii) handling and storage
4. Identify types of hand tools and describe their applications and procedures for use.
5. Describe the procedures used to inspect, maintain and store hand tools.
6. Identify types of power tools and equipment and describe their applications and procedures for use.
 - i) electric/battery
 - ii) pneumatic
 - iii) stationary

7. Describe the procedures used to inspect, maintain and store power tools and equipment.
8. Identify types of powder-actuated tools and equipment and describe their applications.
9. Identify types of measuring and layout tools and equipment, and describe their applications and procedures for use.
10. Describe the procedures used to inspect, maintain and store measuring and layout tools and equipment.

RFG-110 Kettles and Burners

Learning Outcomes:

- Demonstrate knowledge of kettles and burners and their applications.
- Demonstrate knowledge of the procedures to set up and operate kettles and burners.
- Demonstrate knowledge of fire and torch safety.

National Occupational Analysis Reference:

- 1.02 Maintains safe work environment.
- 2.01 Maintains tools and equipment.
- 3.06 Positions equipment and material on the ground and on roof.

Suggested Hours:

20 hours

Objectives and Content:

1. Define terminology associated with kettles and burners.
2. Identify hazards and describe safe working practices pertaining to kettles and burners.
3. Identify regulations and standards pertaining to kettles and burners.
 - i) training and certification
 - ii) handling and storage
4. Identify types of tools and equipment related to kettles and burners and describe their applications and procedures for use.
5. Identify types of kettles and describe their applications and procedures for use.
6. Describe the procedures used to set-up and operate kettles.
7. Describe the procedures used to inspect, maintain and store kettles.

8. Identify types of propane and describe their applications.
 - i) liquid
 - ii) vapour
9. Describe the procedures used to connect and disconnect burner.
10. Describe the procedures used to monitor propane pressure and adjust burner flame.
11. Describe the procedures used to inspect, maintain and store propane.
12. Identify types of burners and describe their applications and procedures for use.
13. Identify the components of a torch assembly.
14. Describe the procedures used to set-up and operate burners.
15. Describe the procedures used to inspect, maintain and store burners.
16. Identify the elements of a comprehensive pre-job inspection.
17. Identify safe torching techniques and describe their associated procedures.
18. Describe the procedures used to perform a post-job fire watch.

RFG-115 Drawings

Learning Outcomes:

- Demonstrate knowledge of drawings and their use.
- Demonstrate knowledge of the procedures to interpret and extract information from drawings.
- Demonstrate knowledge of basic mathematical calculations.
- Demonstrate knowledge of basic sketching techniques.

National Occupational Analysis Reference:

3.01 Interprets blueprints and drawings.

Suggested Hours:

20 hours

Objectives and Content:

1. Define terminology associated with drawings.
2. Describe metric and imperial systems of measurement.
3. Perform basic mathematical calculations.
 - i) whole numbers
 - ii) decimals
 - iii) fractions
 - iv) ratios
4. Perform conversions.
 - i) metric to imperial
 - ii) imperial to metric
 - iii) fractions to decimals
 - iv) decimals to fractions
5. Identify types of drawings and describe their applications.
 - i) architectural
 - ii) mechanical
 - iii) structural
 - iv) electrical

- v) shop/detail drawings
 - vi) sketches
6. Identify drawing related documentation and describe their applications.
- i) change orders
 - ii) addendums
 - iii) as-builts
 - iv) specifications
7. Identify drawing projections and views and describe their applications.
- i) projections
 - orthographic
 - oblique
 - isometric
 - ii) views
 - elevation
 - cross section
 - plan
 - detail
8. Interpret information found on drawings.
- i) lines
 - ii) legend
 - iii) symbols and abbreviations
 - iv) notes and specifications
 - v) schedules
 - vi) scales
9. Demonstrate basic sketching techniques.

RFG-120 Communication and Trade Documentation

Learning Outcomes:

- Demonstrate knowledge of effective communication practices.
- Demonstrate knowledge of trade related documentation and its use.

National Occupational Analysis Reference:

3.04 Communicates with others.

Suggested Hours:

10 hours

Objectives and Content:

1. Describe the importance of effective verbal and non-verbal communication on the job.
 - i) other tradespersons
 - ii) colleagues
 - iii) supervisors
 - iv) clients
 - v) general public
2. Explain the coaching and mentoring relationship between journey person and apprentice.
3. Identify methods and tools used for communication on the job.
4. Identify types of trade related documentation and describe their applications and procedures for use.
 - i) manufacturers' specifications
 - ii) codes and standards
 - National Building Code (NBC)
 - provincial/municipal codes
 - Canadian Standards Association (CSA)
 - iii) environmental protection regulations and guidelines
 - iv) energy efficiency guides
 - v) safety manuals
 - vi) written emergency procedures

- vii) permits
- viii) Canadian Roofing Contractors Association (CRCA) Specifications Manual
- ix) technical and advisory bulletins
- x) work orders

RFG-125 Hoisting, Lifting and Rigging

Learning Outcomes:

- Demonstrate knowledge of hoisting, lifting and rigging equipment, their applications and procedures for use.
- Demonstrate knowledge of the procedures to communicate during hoisting, lifting and rigging operations.

National Occupational Analysis Reference:

- 2.02 Uses hoisting, lifting and rigging equipment.
- 3.04 Communicates with others.
- 3.06 Positions equipment and material on the ground and on the roof.

Suggested Hours:

15 hours

Objectives and Content:

1. Define terminology associated with hoisting, lifting and rigging.
2. Identify hazards and describe safe work practices pertaining to hoisting, lifting and rigging.
3. Interpret regulations pertaining to hoisting, lifting and rigging.
4. Identify types of hoisting and lifting equipment and accessories, and describe their applications, limitations and procedures for use.
 - i) A-frame (swing boom hoist)
 - ii) monorail (trolley track hoist)
 - iii) hand hoist
 - iv) ladder
 - a. hydraulic
5. Describe the procedures used to assemble and disassemble hoist frames and their components.

6. Identify types of rigging equipment and accessories, and describe their applications, limitations and procedures for use.
 - i) slings
 - ii) cables
 - iii) hooks
 - iv) shackles
 - v) spreader bars
 - vi) chain hoists
 - vii) pins
 - viii) chokers
 - ix) block and tackle
 - x) come-alongs
 - xi) ropes
7. Describe the procedures used to inspect, maintain and store hoisting, lifting and rigging equipment.
8. Identify types of knots, hitches and bends and describe their applications and associated procedures.
9. Describe the procedures used to rig material and equipment for hoisting.
10. Identify the methods of communication used during hoisting, lifting and rigging operations and describe their associated procedures.
 - i) hand signals
 - ii) electronic communications
11. Perform hand signals associated with basic hoisting, lifting and rigging operations.

RFG-130 Access Equipment

Learning Outcomes:

- Demonstrate knowledge of access equipment, their applications and procedures for use.
- Demonstrate knowledge of the procedures used to erect and secure temporary access structures.

National Occupational Analysis Reference:

3.05 Accesses work area.

Suggested Hours

10 hours

Objectives and Content:

1. Define terminology associated with access equipment.
2. Identify hazards and describe safe work practices pertaining to access equipment.
3. Interpret codes and regulations pertaining to access equipment.
 - i) heights
 - ii) weights
 - iii) distances
 - iv) sizes
4. Interpret information pertaining to access equipment found on drawings and specifications.
5. Identify tools and equipment pertaining to access equipment and describe their applications and procedures for use.
6. Identify types of access equipment and describe their characteristics and applications.
 - i) Scaffolds
 - ii) Ladders
 - iii) Work platforms

- iv) Hydraulic lifts
 - Scissor lifts
 - Man lifts

- 7. Describe considerations for installing and securing access equipment.
 - i) codes and regulations
 - ii) site conditions
 - iii) manufacturers' specifications and instructions

- 8. Describe the procedures used to erect, secure and dismantle temporary access structures.

- 9. Describe the procedures used to inspect, maintain and store access equipment.

RFG-135 Roofing Materials

Learning Outcomes:

- Demonstrate knowledge of roofing materials, their characteristics and applications.

National Occupational Analysis Reference:

Refers to many sub-tasks throughout the NOA.

Suggested Hours

30 hours

Objectives and Content:

1. Define terminology associated with roofing materials.
2. Identify hazards and describe safe work practices pertaining to roofing materials.
3. Interpret codes and regulations pertaining to roofing materials.
4. Interpret information pertaining to roofing materials found on drawings and specifications.
5. Identify types of low slope/flat roofing materials and describe their characteristics and applications.
 - i) asphalt
 - # 1
 - # 2
 - # 3
 - ii) felts
 - Organic
 - inorganic
 - iii) coal tar saturated
6. Identify types of insulation and describe their characteristics and applications.
 - i) fibreboard

- ii) fibreglass
 - iii) close cell extruded (polystyrene)
 - iv) expanded polystyrene (bead board)
 - v) polyisocyanurate
7. Identify types of cold process materials and describe their characteristics and applications.
- i) mastics
 - ii) asphalt
 - primer
 - emulsions
 - cut backs
 - iii) roof coatings
8. Identify types of steep-roof materials and describe their characteristics and applications.
- i) asphalt shingles
 - three-tab self-sealing
 - interlocking
 - architectural shingles
 - ii) split-wood shakes
 - hand split re-sawn
 - straight split
 - taper split
 - iii) clay tiles
 - spanish
 - mission
 - iv) concrete tiles
 - v) slate
 - vi) metal tiles
 - vii) metal shingles
9. Identify types of single-ply materials and describe their characteristics and applications.
- i) Ethylene propylene diene monomer (EPDM)
 - ii) Polyvinyl chloride (PVC) systems
 - iii) modified bitumen membranes
 - hot mopped
 - torch applied
 - self-adhered
 - iv) Thermoplastic polyolefin (TPO)
10. Identify types of roof coatings and describe their characteristics and applications.
- i) fibrated
 - ii) non-fibrated

iii) rubberized

RFG-140 Introduction to Roof Structures

Learning Outcomes:

- Demonstrate knowledge of roof structures and designs.
- Demonstrate knowledge of basic roof slope calculations.

National Occupational Analysis Reference:

Refers to many sub-tasks throughout the NOA.

Suggested Hours

15 hours

Objectives and Content:

1. Define terminology associated with roof structures.
2. Identify types of roof structures and designs.
 - i) low slope / flat
 - ii) steep
3. Describe roof structural components and accessories and describe their characteristics and applications.
 - i) trusses and rafters
 - ii) beams
 - iii) ridges
 - iv) valleys
 - v) eaves
 - vi) edges
 - vii) decking
 - viii) insulation
 - ix) flashing
 - x) crickets
4. Describe roof slopes.
 - i) ratio/pitch
 - ii) rise to run
 - iii) slope percentage

RFG-145

Planning and Estimating

Learning Outcomes:

- Demonstrate knowledge of planning requirements and procedures.
- Demonstrate knowledge of estimating quantities of material.
- Demonstrate knowledge of job-site preparation.

National Occupational Analysis Reference:

- 3.01 Interprets blueprints and drawings
- 3.02 Estimates materials.
- 3.03 Assesses worksite conditions
- 3.06 Positions equipment and material on the ground and on the roof.
- 3.07 Prepares material disposal systems.

Suggested Hours

30 hours

Objectives and Content:

1. Identify sources of information relevant to work task planning.
 - i) documentation
 - ii) drawings
 - iii) related professionals
 - iv) clients
2. Describe the procedures used to plan work tasks.
 - i) assess worksite conditions and safety
 - ii) select tools, equipment and materials for task
 - iii) identify accessibility to onsite utilities
 - iv) identify waste management procedures
3. Estimate material requirements.
 - i) convert between metric and imperial measurements
 - ii) calculate area and lineal measurements
 - iii) calculate material coverage to manufacturers' specifications
 - iv) calculate volume and weight of old materials for disposal

4. Describe the procedures used to receive and document receipt of materials and supplies on-site.
5. Describe the procedures used to organize and store tools, equipment and materials on-site.
 - i) load/unload truck and sort materials and supplies
 - ii) position equipment and materials on roof
 - weight distribution
 - strategic sequence
 - iii) secure and cover equipment and materials on roof and ground

Level 2

RFG-200 Fasteners, Adhesives and Sealants

Learning Outcomes:

- Demonstrate knowledge of fasteners, their applications and procedures for use.
- Demonstrate knowledge of adhesives, their applications and procedures for use.
- Demonstrate knowledge of sealants, their applications and procedures for use.

National Occupational Analysis Reference:

Refers to many sub-tasks throughout the NOA.

Suggested Hours:

30 hours

Objectives and Content:

1. Define terminology associated with fasteners, adhesives and sealants.
2. Identify hazards and describe safe work practices pertaining to fasteners, adhesives and sealants.
3. Interpret codes and specifications pertaining to the use of fasteners, adhesives and sealants.
4. Identify tools and equipment relating to fasteners, adhesives and sealants and describe their applications and procedures for use.
 - i) powder-actuated
5. Identify types of fasteners and describe their characteristics and applications.
 - i) nails
 - screws
 - bolts
 - clips
 - plates
 - anchors

- bars
 - staples
 - pop rivets
6. Describe the procedures used to install and remove fasteners.
 7. Identify types of adhesives and describe their characteristics and applications.
 - i) contact cement
 - ii) seam tape
 - iii) primer
 - iv) two-part
 - v) solvent
 - vi) water-based
 8. Describe the procedures used to apply and remove adhesives.
 9. Identify types of sealants and describe their characteristics and applications.
 - i) mastic
 - ii) caulking
 10. Describe the procedures used to apply and remove sealants.

RFG-205 Mechanical Roofing Equipment

Learning Outcomes:

- Demonstrate knowledge of mechanical equipment, their applications and procedures for use.

National Occupational Analysis Reference:

- 2.03 Uses motorized equipment.
- 3.06 Positions equipment and material on the ground and on the roof.

Suggested Hours

15 hours

Objectives and Content:

1. Define terminology associated with mechanical roofing equipment.
2. Identify hazards and describe safe work practices pertaining to mechanical roofing equipment.
3. Interpret regulations pertaining to mechanical roofing equipment.
4. Identify types of mechanical equipment and describe their applications and procedures for use.
 - i) skid steer loader
 - ii) sweepers
 - iii) spreaders
 - asphalt
 - gravel
 - iv) roof cutters
 - v) roof rippers
 - vi) roof planers
 - vii) power buggies
 - viii) mini mopper
 - ix) spudders
 - x) automated seamer
 - xi) felt layers

5. Describe the procedures used to inspect, maintain and store mechanical equipment.

RFG-210 Roof Deck Preparation

Learning Outcomes:

- Demonstrate knowledge of roof deck components and their applications.
- Demonstrate knowledge of the procedures used to prepare a roof deck for replacement.
- Demonstrate knowledge of the procedures used to prepare a roof deck for new installation.

National Occupational Analysis Reference:

- 4.01 Protects surrounding area.
- 4.02 Remove loose debris.
- 4.03 Remove roofing and flashings.
- 4.04 Prepares roof substrate.
- 4.05 Performs minor adjustments to penetrations, curbs and parapets.
- 4.06 Installs water cut-offs, temporary seals and temporary drains.
- 5.01 Inspects deck.
- 5.02 Cleans deck.
- 5.03 Verifies placement of roof penetrations, curbs and parapets.
- 5.04 Dries deck.

Suggested Hours:

60 hours

Objectives and Content:

1. Define terminology associated with roof deck preparation.
2. Identify hazards and describe safe work practices pertaining to roof deck preparation.
3. Interpret codes and regulations pertaining to roof deck preparation.
4. Interpret information pertaining to roof deck preparation found on drawings and specifications.
5. Identify tools and equipment relating to roof deck preparation and describe their applications and procedures for use.

6. Identify types of roof decks and describe their characteristics and applications.
 - i) wood
 - sawed lumber
 - planks
 - plywood/oriented strand board (OSB) sheathing
 - wood tongue and groove
 - ii) steel
 - corrugated metal
 - cold-rolled
 - iii) concrete
 - precast
 - pre-stressed
 - poured in place
 - light weight concrete fill

7. Identify types of roof deck components and describe their purpose and applications.
 - i) leveling surface
 - ii) vapour barrier
 - iii) insulation
 - iv) cover board

8. Identify types of water cut-offs and describe their applications.
 - i) temporary
 - ii) permanent

9. Describe the procedures used to prepare a roof for replacement.
 - i) assess and protect surrounding area
 - ii) remove loose debris
 - iii) remove damaged or deteriorated roofing
 - iv) remove flashings
 - v) prepare roof substrate
 - vi) perform minor adjustments to height of penetrations and parapets
 - vii) install water cut-offs, temporary seals and temporary drains
 - viii) clean up and dispose of waste

10. Describe the procedures used to prepare a deck for new roof installation.
 - i. inspect deck
 - ii. clean deck
 - iii. verify placement of roof penetrations, curbs and parapets

11. Describe factors to be considered when preparing a deck in the winter.

RFG-215 Roof Membrane Systems I

Learning Outcomes:

- Demonstrate knowledge of roof membranes and their applications.
- Demonstrate knowledge of the procedures to install BUR roof membrane systems.
- Demonstrate knowledge of the procedures used to install cold process roof membranes.
- Demonstrate knowledge of the procedures used to install hot rubberized roof membranes.
- Demonstrate knowledge of the procedures to install membrane flashings.

National Occupational Analysis Reference:

- 7.01 Relaxes membranes.
- 7.02 Sets membranes.
- 7.03 Applies membranes using hot-liquid process.
- 7.04 Applies membranes using torched-on method.
- 7.05 Applies membranes using hot-air welding.
- 7.06 Applies membranes using cold process.
- 7.07 Applies membranes using mechanical fasteners.
- 7.09 Applies membrane flashings.

Suggested Hours

30 hours

Objectives and Content:

1. Define terminology associated with roof membranes.
2. Identify hazards and describe safe work practices pertaining to roof membranes.
3. Interpret codes and regulations pertaining to roof membranes.
4. Interpret information pertaining to roof membranes found on drawings and specifications.

5. Identify tools and equipment relating to roof membranes and describe their applications and procedures for use.
6. Identify roof membrane systems and describe their applications.
 - i) built up roof (BUR)
 - ii) cold process roof
 - iii) hot rubberized roofing
7. Describe procedures used to install roof membrane systems.
 - i) cold process
 - ii) hot liquid process
8. Describe the procedures used to install membrane flashings.

RFG-220 Low Slope and Flat Roofs

Learning Outcomes:

- Demonstrate knowledge of low slope and flat roofs and their components.
- Demonstrate knowledge of the procedures to install low slope and flat roof components.

National Occupational Analysis Reference:

- 6.01 Installs leveling surface.
- 6.02 Primes substrate.
- 6.03 Applies vapour retarder, vapour barrier and air barrier.
- 6.04 Installs insulation.
- 6.05 Installs cover board.
- 6.06 Installs drains, vents, curbs and penetrations.
- 6.07 Applies ballast, walkways and protective surfaces.
- 6.08 Installs metal flashings.

Suggested Hours

45 hours

Objectives and Content:

1. Define terminology associated with low slope and flat roofs (built-up roofing).
2. Identify hazards and describe safe work practices pertaining to low slope and flat roofs.
3. Interpret codes and regulations pertaining to low slope and flat roofs.
4. Interpret information pertaining to low slope and flat roofs found on drawings and specifications.
5. Identify tools and equipment pertaining to the installation of low slope and flat roof components and describe their applications and procedures for use.

6. Identify types of low slope and flat roofs and describe their characteristics and applications.
 - i) inverted roof membrane assembly (IRMA)
 - ii) smooth
 - iii) cold process

7. Identify low slope and flat roof components and describe their characteristics and applications.
 - i) levelling surface
 - gypsum products
 - sheeting boards
 - ii) primers
 - water-based
 - solvent-based
 - iii) vapour retarders, vapour barriers and air barriers
 - iv) insulations
 - polystyrene (expanded and extruded)
 - polyisocyanurate
 - fibreglass
 - v) cover board
 - wood fibre
 - asphalt-impregnated
 - asphalt-coated
 - plain
 - asphalt core boards
 - vi) drains, vents, curbs and penetrations
 - vii) ballasts, walkways and protective surfaces
 - viii) flashings
 - self-adhesive
 - modified bitumen
 - felt

8. Identify materials used in low slope and flat roof installation.
 - i) asphalts
 - ii) hot rubberized roofing
 - iii) adhesives
 - iv) felts
 - organic
 - glass

8. Calculate material requirements.

10. Identify methods used to install low slope and flat roof components and describe their associated procedures.

- i) cold process
 - cutbacks
 - emulsions
- ii) asphalt
- iii) hot rubberized

Level 3

MENT-1802 Workplace Mentoring II
(Nova Scotia Unit of Instruction)

Learning Outcomes:

- Identify and explain strategies for teaching workplace skills.
- Demonstrate strategies to assist in teaching skills in the workplace

Objectives and Content:

1. Describe the impact of your own experiences in teaching skills.
2. Identify the different roles played by a workplace mentor.
3. Describe the six-step approach to teaching skills.
4. Explain the importance of identifying the point of the lesson.
5. Identify how to choose a good time to present a lesson.
6. Explain the importance of linking the lessons.
7. Identify the components of the skill (the context).
8. Describe considerations for demonstrating a skill.
9. Identify types of skill practice.
10. Describe considerations in setting up opportunities for skill practice.
11. Explain the importance of providing feedback.
12. Identify techniques for giving effective feedback.
13. Describe a skill assessment.
14. Identify methods of assessing progress.
15. Explain how to adjust a lesson to different situations.

Resource:

- Recommended resource to use in the delivery of this unit:
www.apprenticeship.nsc.ca/mentoring/apprentice.htm

RFG-300 Roof Membrane Systems II

Learning Outcomes:

- Demonstrate knowledge of the procedures to install thermoset roof membranes.
- Demonstrate knowledge of the procedures to install thermoplastic roof membranes.
- Demonstrate knowledge of the procedures to install modified bitumen roof membranes.

National Occupational Analysis Reference:

- 7.01 Relaxes membranes.
- 7.02 Sets membranes.
- 7.03 Applies membranes using hot-liquid process.
- 7.04 Applies membranes using torched-on method.
- 7.05 Applies membranes using hot-air welding.
- 7.06 Applies membranes using cold process.
- 7.07 Applies membranes using mechanical fasteners.
- 7.08 Applies loose-laid membranes.
- 7.09 Applies membrane flashings.

Suggested Hours

30 hours

Objectives and Content:

1. Define terminology associated with roof membranes.
2. Identify hazards and describe safe work practices pertaining to roof membranes.
3. Interpret codes and regulations pertaining to roof membranes.
4. Interpret information pertaining to roof membranes found on drawings and specifications.
5. Identify tools and equipment relating to roof membranes and describe their applications and procedures for use.

6. Identify types of roof membrane systems and describe their applications.
 - i) thermoset
 - ii) thermoplastic
 - iii) modified bitumen

7. Describe the procedures used to install roof membrane systems.
 - i) torched-on
 - ii) loose-laid and ballasted
 - iii) fully adhered
 - iv) mechanically attached

8. Describe the procedures used to secure and seal seams.
 - i) hot-air welding
 - ii) adhesives
 - iii) splice tape

9. Describe the procedures used to install membrane flashings.

RFG-305 Steep Roofs

Learning Outcomes:

- Demonstrate knowledge of steep roofs and their components.
- Demonstrate knowledge of the procedures to install steep roof components.
- Demonstrate knowledge of the procedures to install, repair and replace roof coverings.

National Occupational Analysis Reference:

- 8.01 Installs steep slope underlayment
- 8.02 Installs attic vent flashings
- 8.03 Installs valley treatments
- 8.04 Installs saddles/crickets
- 8.05 Installs metal flashings for steep slope roofs

Suggested Hours

30 hours

Objectives and Content:

1. Define terminology associated with steep roofs.
2. Identify hazards and describe safe work practices pertaining to steep roofs.
3. Interpret codes and regulations pertaining to steep roofs.
4. Interpret information pertaining to steep roofs found on drawings and specifications.
5. Identify tools and equipment relating to the installation of steep roof components and describe their applications and procedures for use.
6. Identify steep roof components and describe their characteristics and applications.
 - i) underlayment
 - ii) attic vent flashings

- iii) valley treatments
 - iv) saddles/crickets
 - v) metal flashings
7. Identify types of roof coverings and describe their characteristics and applications.
- i) shingles
 - interlocking
 - metal
 - asphalt
 - ii) shakes
 - cedar
 - metal
 - iii) tiles
 - clay
 - metal
 - concrete
 - slate
 - iv) pre-formed metal sheets
 - v) recycled products
8. Identify materials used in steep roof installation.
- i) adhesives
 - ii) fasteners
 - iii) starter and closure strips
 - iv) ridge and hip caps
 - v) snow guards
9. Calculate material requirements.
10. Identify methods used to install steep roof components and describe their associated procedures.
11. Describe procedures used to install, repair and replace roof coverings.

RFG-310 Waterproofing and Damp-Proofing

Learning Outcomes:

- Demonstrate knowledge of waterproofing and damp-proofing and their applications.
- Demonstrate knowledge of the procedures to waterproof and damp-proof.

National Occupational Analysis Reference:

- 12.01 Prepares waterproofing substrates
- 12.02 Applies waterproofing membrane
- 12.03 Installs green, sustainable, vegetative and protected membrane components
- 13.01 Applies coatings
- 13.02 Applies protection layer

Suggested Hours

15 hours

Objectives and Content:

1. Define terminology associated with waterproofing and damp-proofing.
2. Identify hazards and describe safe work practices pertaining to waterproofing and damp-proofing.
3. Interpret codes and regulations pertaining to waterproofing and damp-proofing.
4. Interpret information pertaining to waterproofing and damp-proofing found on drawings and specifications.
5. Identify tools and equipment pertaining to waterproofing and damp-proofing, and describe their applications and procedures for use.
6. Identify types of surfaces to be waterproofed and describe their characteristics.
 - i) wood

- ii) concrete
 - iii) cinder blocks
7. Identify types of waterproofing components and describe their characteristics and applications.
 - i) primers
 - ii) insulations
 - iii) membranes
 8. Describe the procedures used to inspect and prepare wall or deck surfaces for waterproofing.
 9. Describe the procedures used to install waterproofing membrane.
 10. Describe the procedures used to install protection board.
 11. Identify types of damp-proof coatings and describe their applications.
 - i) single
 - ii) multi-coat
 12. Identify types of primers and describe their applications.
 - i) water-based
 - ii) solvent-based
 13. Describe the procedures used to apply primers.
 14. Identify the methods used to apply coatings and describe their associated procedures.
 - i) spraying
 - ii) brushing
 - iii) rolling
 - iv) trowelling

RFG-315 Metal Flashings

Learning Outcomes:

- Demonstrate knowledge of metal flashings and their applications.
- Demonstrate knowledge of the procedures to fabricate and install metal flashings.

National Occupational Analysis Reference:

8.05 Installs metal flashings for steep slope roofs

Suggested Hours

15 hours

Objectives and Content:

1. Define terminology associated with metal flashings.
2. Identify hazards and describe safe work practices pertaining to metal flashings.
3. Interpret codes and regulations pertaining to metal flashings.
4. Interpret information pertaining to metal flashings found on drawings and specifications.
5. Identify tools and equipment pertaining to metal flashings and describe their applications and procedures for use.
6. Explain the principles of watershed design.
7. Identify types of metal flashings and describe their characteristics and applications.
 - i) aluminum
 - ii) copper
 - iii) stainless steel
 - iv) pre-painted steel
 - v) galvanized

8. Calculate flashing material requirements.
9. Describe the procedures used to fabricate and install metal flashings.

RFG-320 Roof Maintenance and Repair

Learning Outcomes:

- Demonstrate knowledge of the procedures to inspect, maintain and repair roofs.
- Demonstrate knowledge of roof preventive maintenance procedures.

National Occupational Analysis Reference:

- 14.01 Performs roof inspections
- 14.02 Performs cut test
- 14.03 Determines maintenance or repair required
- 15.01 Maintains drains and scuppers
- 15.02 Refills penetration pockets
- 15.03 Replaces deteriorated caulking
- 15.04 Repairs membrane defects
- 15.05 Reapplies surfacing and ballast to bare areas
- 15.06 Repairs steep roofing defects
- 15.07 Re-secures loose metal flashing

Suggested Hours

30 hours

Objectives and Content:

1. Define terminology associated with roof maintenance and repair.
2. Identify hazards and describe safe work practices pertaining to roof maintenance and repair.
3. Interpret codes and regulations pertaining to roof maintenance and repair.
4. Interpret information pertaining to roof maintenance and repair found on drawings and specifications.
5. Identify tools and equipment relating to the maintenance and repair of roofs and describe their applications and procedures for use.

6. Describe the procedures used to assess roof conditions and identify defects.
 - i) inspection
 - ii) cut test

7. Identify common defects and failures in roof membranes and decks and describe the procedures used to correct them.
 - i) bleeding
 - ii) deterioration
 - iii) irregularities
 - iv) deflection of deck
 - v) uncured concrete
 - vi) corrosion

8. Describe procedures used to repair roofs.
 - i) BUR
 - ii) cold process
 - iii) modified bitumen
 - iv) thermoset
 - v) thermoplastic
 - vi) steep roofs

9. Describe roof preventive maintenance procedures.

RFG-325 Job Planning

Learning Outcomes:

- Demonstrate knowledge of the procedures used to plan and organize jobs.

National Occupational Analysis Reference:

- 3.01 Interprets blueprints and drawings
- 3.02 Estimates material
- 3.03 Assesses worksite conditions
- 3.04 Communicates with others
- 3.06 Positions equipment and materials

Suggested Hours

15 hours

Objectives and Content:

1. Compile information relevant to job planning.
 - i) documentation
 - specifications
 - regulations
 - reference materials
 - ii) drawings
 - iii) related professionals
 - iv) clients
 - v) maintenance and inspection reports

2. Identify considerations for determining job requirements and describe their associated procedures.
 - i) hazard and environmental assessment
 - ii) personnel
 - iii) tools and equipment
 - iv) materials
 - v) waste management
 - vi) permits and documentation

3. Describe the procedures used to plan jobs.
 - i) scheduling
 - ii) estimating
 - iii) documenting and reporting
4. Describe the procedures used to organize and store tools, equipment and materials on-site.

RFG-1830

Program Review

(Nova Scotia Unit of Instruction)

Learning Outcomes:

- Upon successful completion of this unit, the apprentice will complete a study plan based on the National Occupational Analysis.

Objectives and Content:

1. Identify areas of the program where knowledge of theory is weakest.
2. Identify areas where workplace experience is lacking or weak.
3. Identify resources necessary to address areas of shortfall.
4. Identify timelines to address areas of weakness.

Suggested Learning Activities:

1. Conduct a mock certification exam to be used for diagnostic purposes.
2. Review the National Occupational Analysis.
3. Review the Apprentice Logbook.
4. Review the Exam Preparation information found at www.nsapprenticeship.ca under Quick Links, Exam Preparation.
5. Conduct a final mock certification exam.

Resources:

These are the recommended resources to use in the delivery of this unit:

- Exam Preparation information, including videos, occupational analyses, exam counseling sheets, practice exams and sample questions, and other study materials and resources, can be found at www.nsapprenticeship.ca under Quick Links, Exam Preparation.
- Apprentice's personal logbook
- Applicable codes and regulations
- Program texts

Evaluation: pass/fail

Nova Scotia Document Evaluation Form

Thank you for your interest in the development and revision of this document. Upon review of the document, please record your feedback in relation to the following items:

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