NOVA SCOTIA
APPRENTICESHIP
AGENCY

NOVA SCOTIA CURRICULUM STANDARD

ROOFER

Based on National Harmonization Recommendations

NSCS V1 | 2022

Nova Scotia Apprenticeship Curriculum Standard

Roofer

Preface

This Nova Scotia Curriculum Standard (NSCS) is intended to assist instructional staff in the design and delivery of technical, in-class training in support of the apprenticeship program.

This NSCS contains all the technical training elements required to complete the apprenticeship program and has been developed based on the 2020 Red Seal Occupational Standard (RSOS) for the trade.

Implementation of the NSCS for Apprenticeship training is outlined in the following table.

Level	Implementation Effective
Level 1	2022-2023
Level 2	2023-2024
Level 3	2024-2025

The above implementation schedule was current at time of publication.

Granting of credit or permission to challenge level examinations (if applicable) for pre-apprenticeship training for this trade will be based on the content outlined in this standard. Training providers must contact the Nova Scotia Apprenticeship Agency for more information on the process and requirements for determining eligibility for credit towards an apprenticeship program.

Acknowledgements

The Nova Scotia Apprenticeship Agency (Agency) wishes to acknowledge the contributions of trade advisory committee members, tradespersons, industry establishments, professional associations, labour organizations, training providers, government departments and agencies, and all others who contributed to this publication.

Special thanks are offered to the following representatives who contributed greatly to the original draft of the standard and provided expert advice throughout its development.

Troy Perfrement	Nova Scotia Community College
Gerald Phillippo	Sheet Metal Workers & Roofers, International Association, Local 56

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User Guide

Nova Scotia Curriculum Standards (NSCS) are developed based on Red Seal Occupational Standards (RSOS) or Nova Scotia Occupational Standards (NSOS) and industry consultation. This document represents the minimum content to be delivered as part of the apprenticeship program for this trade.

The NSCS documents are purposefully constructed for ease of use and flexibility of structure in order to adapt to all delivery requirements. They detail units of training, unit outcomes and objectives. They do not impose a delivery model or teaching format.

Training providers will select and develop delivery materials and techniques that accommodate a variety of learning styles and delivery patterns. The NSCS does not dictate study materials, textbooks or learning activities to be used in delivery.

This document includes a Level Structure to facilitate mobility for apprentices moving from one jurisdiction to another.

Structure

The content of the NSCS is divided into units. Unit codes are used as a means of identification and are not intended to convey the order of delivery. It is at the discretion of the training provider to deliver the content in the required logical sequence of delivery within the level. Units may be delivered one at a time or concurrently within a level, provided all outcomes are met.

The Learning Outcomes describe what the apprentice should know or be able to do at the end of training. Wording of the Learning Outcomes, “Demonstrate knowledge of…” acknowledges the broad spectrum of ways in which knowledge can be assessed (i.e. practical projects, multiple choice testing, presentations, etc.) by instructional staff within the training.

User Guide (continued)

The Occupational Standard (OS) to Curriculum Comparison chart maps the OS trade skills/sub-tasks to the curriculum standard.

Each unit of training in the curriculum standard lists both theoretical and practical objectives, which represent the minimum content that must be covered during technical training. Detailed content/bulleted lists for each objective have not been developed. Where detail is required for clarity, content has been provided.

The practical objectives represent the tasks/skills that apprentices must be exposed to during technical training. An individual or group performance of the task/skill is recommended; if not possible, an instructor demonstration is acceptable. Training Providers should use practical, hands-on learning whenever possible, whether identified in the curriculum standard as a practical objective or not.

Each unit also provides suggested hours (a guide only), which can be adjusted for apprentice learning, delivery methods, practical/hands-on learning, examinations, registration, holidays, storm days, etc.

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 an individual 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.
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.
PURPOSE	The reason for which something exists or is done, made or used.

Glossary of Terms (continued)

SERVICE	Routine inspection and replacement of worn or deteriorating parts. An act or business function provided to a customer in the course of an individual'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

Through extensive research, the Government of Canada and other national and international agencies have identified and validated key essential skills for the workplace. These skills are used in nearly every job and at different levels of complexity. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Essential Skills Profiles describe how workers in various occupations use each of the key essential skills. They include:

- a brief description of the occupation;
- examples of tasks that illustrate how each essential skill is applied; and,
- complexity ratings that indicate the level of difficulty of the example tasks.

Essential Skills profiles can be found on the Employment and Social Development Canada (ESDC) website at https://www.canada.ca/en/services/jobs/training/initiatives/skills-success/tools.html

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

Profile Chart

Common Occupational Skills			
RFG-100 Safety	RFG-105 Tools and Equipment	RFG-110 Kettles and Burners	RFG-115 Blueprints and Drawings
RFG-120 Communication and Trade Documentation	RFG-125 Hoisting, Lifting and Rigging	RFG-130 Access Equipment	RFG-145 Worksite Preparation
RFG-205 Motorized Equipment	RFG-340 Job Planning	MENT-700 Mentoring I	MENT-701 Mentoring II
Roof Preparation			
RFG-140 Introduction to Roof Structures and Components	RFG-210 Roof Deck Preparation		
Low Slope Roofing			
RFG-135 Roofing Materials	RFG-225 Low Slope Roofs	RFG-200 Fasteners, Adhesives, and Sealants	RFG-155 BUR Membranes
RFG-215 Modified Bitumen Membranes	RFG-220 Cold Process and Hot Rubberized Membranes		
Steep Slope Roofing			
RFG-150 Asphalt Shingles	RFG-230 Wood and Composite Shingles	RFG-300 Thermoplastic, Thermoset and Liquid-applied Membranes	RFG-305 Steep Slope Roofs
RFG-310 Metal Shingles	RFG-315 Roof Tiles	RFG-320 Pre-formed Metal Roofing	RFG-330 Metal Flashings
Waterproofing and Damp-proofing			
RFG-235 Waterproofing and Damp-proofing	RFG-325 Green Roof Waterproof Membranes		
Roof Maintenance and Repair			
RFG-335 Roof Maintenance and Repair			

Level Structure

Level 1, 7 Weeks (210 hrs)

Code	Unit Title	Hrs*	Pg	Practical Objectives*
RFG-100	Safety	12	22	None
RFG-105	Tools and Equipment	15	25	None
RFG-110	Kettles and Burners	18	27	None
RFG-115	Blueprints and Drawings	21	29	None
RFG-120	Communication and Trade Documentation	9	31	None
RFG-125	Hoisting, Lifting and Rigging	15	33	1. Tie knots. 2. Perform basic hand signals.
RFG-130	Access Equipment	9	36	None
RFG-135	Roofing Materials	24	38	None
RFG-140	Introduction to Roof Structures and Components	18	40	None
RFG-145	Worksite Preparation	24	42	None
RFG-150	Asphalt Shingles	9	45	1. Install asphalt shingles.
RFG-155	Built-up Roofing (BUR) Membranes	30	47	1. Instructor demonstration of ply application.
MENT-700	Mentoring I	6	49	None

Level 2, 6 Weeks (180 hrs)

Code	Unit Title	Hrs*	Pg	Practical Objectives*
RFG-200	Fasteners, Adhesives and Sealants	24	52	None
RFG-205	Motorized Equipment	15	54	None
RFG-210	Roof Deck Preparation	48	56	None
RFG-215	Modified Bitumen Membranes	15	59	1. Relax and set membranes. 2. Apply membranes using hot-air and/or torch-applied methods.
RFG-220	Cold Process and Hot Rubberized Membranes	12	61	1. Instructor demonstration or video of cold process membranes. 2. Instructor demonstration or video of hot rubberized membranes.
RFG-225	Low Slope Roofs	42	63	None
RFG-230	Wood and Composite Shingles	6	66	1. Install wood and/or composite shingles.
RFG-235	Waterproofing and Damp-Proofing	18	68	1. Instructor demonstration or video of damp-proofing.

Level Structure (continued)

Level 3, 6 Weeks (180 hrs)

Code	Unit Title	Hrs*	Pg	Practical Objectives*
RFG-300	Thermoplastic, Thermoset & Liquid-applied Membranes	24	71	1. Relax and set membranes. 2. Apply seam tape to thermosets. 3. Apply membranes using hot-air methods.
RFG-305	Steep Slope Roofs	21	74	None
RFG-310	Metal Shingles	9	76	None
RFG-315	Roof Tiles	9	78	None
RFG-320	Pre-formed Metal Roofing	9	80	None
RFG-325	Green Roof Waterproof Membranes	6	82	None
RFG-330	Metal Flashings	15	84	None
RFG-335	Roof Maintenance and Repair	30	86	None
RFG-340	Job Planning	21	88	1. Interpret blueprints and drawings.
MENT-701	Mentoring II	6	91	None
RFG-350	Program Review	30	92	None

***Hours:** The time it should take to cover the unit (a guide only).

***Practical Objectives:** The tasks/skills apprentices must be exposed to during technical training. An individual or group performance of the task/skill is recommended; if not possible, an instructor demonstration is acceptable. Training Providers should use practical, hands-on learning whenever possible, whether identified in the curriculum as a practical objective or not.

2020 RSOS Sub-task to NS Curriculum Unit Comparison

RSOS Sub-task		NSCS Unit	
Task 1, Performs safety related functions			
1.01	Maintains safe work environment.	RFG-100	Safety
1.02	Uses personal protective equipment (PPE) and safety equipment.	RFG-100	Safety
Task 2, Maintains and uses tools and equipment			
2.01	Uses hand tools.	RFG-105	Tools and Equipment
		RFG-110	Kettles and Burners
2.02	Uses power tools, pneumatic tools, and hot-air welding, induction and fuelled equipment.	RFG-105	Tools and Equipment
2.03	Uses hoisting, lifting and rigging equipment.	RFG-125	Hoisting, Lifting and Rigging
2.04	Uses access equipment.	RFG-130	Access Equipment
2.05	Uses hot process equipment.	RFG-110	Kettles and Burners
		RFG-155	BUR Membranes
		RFG-215	Modified Bitumen Membranes
		RFG-220	Cold Process and Hot Rubberized Membranes
		RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
2.06	Uses motorized equipment.	RFG-105	Tools and Equipment
		RFG-205	Motorized Equipment
Task 3, Organizes work			
3.01	Uses documentation and references materials.	RFG-120	Communication and Trade Documentation
		RFG-340	Job Planning
3.02	Interprets blueprints and drawings.	RFG-115	Blueprints and Drawings
		RFG-340	Job Planning
		Throughout document	
3.03	Estimates material.	RFG-145	Worksite Preparation
		RFG-210	Roof Deck Preparation
		RFG-340	Job Planning
3.04	Assesses worksite conditions.	RFG-145	Worksite Preparation
		RFG-325	Job Planning
3.05	Positions equipment and material on the ground and on the roof.	RFG-110	Kettles and Burners
		RFG-125	Hoisting, Lifting and Rigging
		RFG-145	Worksite Preparation
		RFG-205	Mechanical Roofing Equipment
		RFG-340	Job Planning
3.06	Prepares material disposal system.	RFG-145	Worksite Preparation

RSOS Sub-task		NSCS Unit	
		RFG-210	Roof Deck Preparation
3.07	Evaluates roof conditions near rooftop equipment installations.	RFG-340	Job Planning
Task 4, Uses communication and mentoring			
4.01	Uses communication techniques.	RFG-120	Communication and Trade Documentation
		RFG-125	Hoisting, Lifting and Rigging
		RFG-325	Job Planning
4.02	Uses mentoring techniques	MENT-700	Mentoring I
		MENT-701	Mentoring II
Task 5, Prepares roof for replacement			
5.01	Protects surrounding area.	RFG-145	Worksite Preparation
		RFG-210	Roof Deck Preparation
5.02	Removes loose debris.	RFG-145	Worksite Preparation
		RFG-210	Roof Deck Preparation
5.03	Removes roofing and flashing.	RFG-145	Worksite Preparation
		RFG-210	Roof Deck Preparation
5.04	Prepares roof substrate.	RFG-210	Roof Deck Preparation
5.05	Performs minor adjustments to penetrations, curbs, and parapets.	RFG-210	Roof Deck Preparation
Task 6, Prepares deck for roof installation			
6.01	Inspects deck.	RFG-210	Roof Deck Preparation
6.02	Cleans surface of deck.	RFG-145	Worksite Preparation
		RFG-210	Roof Deck Preparation
6.03	Verifies placement of roof penetrations, curbs, and parapets.	RFG-210	Roof Deck Preparation
6.04	Dries deck.	RFG-145	Worksite Preparation
		RFG-210	Roof Deck Preparation
Task 7, Applies low slope roofing components			
7.01	Installs support panels.	RFG-140	Introduction to Roof Structures and Components
		RFG-220	Cold Process and Hot Rubberized Membranes
7.02	Primes substrate.	RFG-140	Introduction to Roof Structures and Components
		RFG-220	Cold Process and Hot Rubberized Membranes
7.03	Applies vapour retarder, vapour barrier and air barrier.	RFG-140	Introduction to Roof Structures and Components
		RFG-220	Cold Process and Hot Rubberized Membranes

RSOS Sub-task		NSCS Unit	
7.04	Installs insulation.	RFG-140	Introduction to Roof Structures and Components
		RFG-220	Cold Process and Hot Rubberized Membranes
7.05	Installs cover board.	RFG-140	Introduction to Roof Structures and Components
		RFG-220	Cold Process and Hot Rubberized Membranes
7.06	Installs drains, vents, curbs and penetrations.	RFG-140	Introduction to Roof Structures and Components
		RFG-220	Cold Process and Hot Rubberized Membranes
7.07	Applies ballast, walkways, and protective surfaces.	RFG-220	Cold Process and Hot Rubberized Membranes
7.08	Installs metal flashings.	RFG-220	Cold Process and Hot Rubberized Membranes
		RFG-305	Steep Slope Roofs
Task 8, Applies membranes			
8.01	Relaxes membranes.	RFG-215	Modified Bitumen Membranes
		RFG-220	Cold Process and Hot Rubberized Membranes
		RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
8.02	Sets membranes.	RFG-155	Built-up Roofing Membranes
		RFG-215	Modified Bitumen Membranes
		RFG-220	Cold Process and Hot Rubberized Membranes
		RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
8.03	Applies membranes using hot-liquid process.	RFG-155	Built-up Roofing Membranes
		RFG-215	Modified Bitumen Membranes
		RFG-220	Cold Process and Hot Rubberized Membranes
		RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
8.04	Applies membranes using torched-on method.	RFG-155	Built-up Roofing Membranes
		RFG-215	Modified Bitumen Membranes
8.05	Applies membranes using hot-air welding.	RFG-255	Built-up Roofing Membranes
		RFG-215	Modified Bitumen Membranes
		RFG-220	Cold Process and Hot Rubberized Membranes
		RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes

RSOS Sub-task		NSCS Unit	
8.06	Applies membranes using cold-applied methods.	RFG-155	Built-up Roofing Membranes
		RFG-215	Modified Bitumen Membranes
		RFG-220	Cold Process and Hot Rubberized Membranes
		RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
8.07	Applies membranes using mechanical fasteners.	RFG-155	Built-up Roofing Membranes
		RFG-200	Fasteners, Adhesives and Sealants
		RFG-215	Modified Bitumen Membranes
		RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
8.08	Applies loose-laid membranes.	RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
8.09	Applies liquid-applied membranes.	RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
8.10	Installs membrane flashings.	RFG-155	Built-up Roofing Membranes
		RFG-215	Modified Bitumen Membranes
		RFG-220	Cold Process and Hot Rubberized Membranes
		RFG-300	Thermoplastic, Thermoset and Liquid-applied Membranes
Task 9, Performs common steep slope practices			
9.01	Installs steep slope underlayment.	RFG-140	Introduction to Roof Structures and Components.
		RFG-305	Steep Slope Roofs
9.02	Installs steep slope venting.	RFG-140	Introduction to Roof Structures and Components.
		RFG-305	Steep Slope Roofs
9.03	Installs steep slope valley applications.	RFG-140	Introduction to Roof Structures and Components.
		RFG-305	Steep Slope Roofs
9.04	Installs steep slope saddles/crickets.	RFG-140	Introduction to Roof Structures and Components.
		RFG-305	Steep Slope Roofs
9.05	Installs steep slope penetration flashings.	RFG-140	Introduction to Roof Structures and Components.
		RFG-305	Steep Slope Roofs
		RFG-140	Introduction to Roof Structures and Components.
		RFG-330	Metal Flashings
Task 10, Applies shingles			
10.01	Determines layout of shingles.	RFG-150	Asphalt Shingles

RSOS Sub-task		NSCS Unit	
		RFG-230	Wood and Composite Shingles
		RFG-310	Metal Shingles
10.02	Installs starter strip and starter course.	RFG-150	Asphalt Shingles
		RFG-230	Wood and Composite Shingles
		RFG-310	Metal Shingles
10.03	Fastens shingles.	RFG-150	Asphalt Shingles
		RFG-230	Wood and Composite Shingles
		RFG-310	Metal Shingles
10.04	Cuts shingles.	RFG-150	Asphalt Shingles
		RFG-230	Wood and Composite Shingles
		RFG-310	Metal Shingles
10.05	Tabs shingles.	RFG-150	Asphalt Shingles
10.06	Installs metal flashings for shingled roofs.	RFG-150	Asphalt Shingles
		RFG-230	Wood and Composite Shingles
		RFG-310	Metal Shingles
Task 11, Applies roof tiles			
11.01	Installs battens/strapping for roof tiles.	RFG-315	Roof Tiles
11.02	Fastens roof tiles.	RFG-315	Roof Tiles
11.03	Cuts roof tiles.	RFG-315	Roof Tiles
11.04	Installs closure strips for roof tiles.	RFG-315	Roof Tiles
11.05	Installs ridge and hip caps.	RFG-315	Roof Tiles
11.06	Installs metal flashings for tiled roofs.	RFG-315	Roof Tiles
Task 12, Applies pre-formed metal roofing			
12.01	Installs battens/strapping for pre-formed metal roofing.	RFG-320	Pre-formed Metal Roofing
12.02	Fastens pre-formed metal roofing.	RFG-320	Pre-formed Metal Roofing
12.03	Cuts sheet metal.	RFG-320	Pre-formed Metal Roofing
12.04	Installs closure strips for pre-formed metal roofing.	RFG-320	Pre-formed Metal Roofing
12.05	Installs snow guards.	RFG-320	Pre-formed Metal Roofing
12.06	Installs metal flashings for pre-formed metal roofs.	RFG-320	Pre-formed Metal Roofing
Task 13, Waterproofs surfaces			
13.01	Prepares waterproofing substrates.	RFG-235	Waterproofing and Damp-proofing
13.02	Applies waterproofing membrane.	RFG-235	Waterproofing and Damp-proofing
13.03	Installs green, sustainable, vegetative and, protected membrane components.	RFG-325	Green Roof Waterproof Membranes
Task 14, Damp-proofs surfaces			
14.01	Applies damp-proofing materials.	RFG-235	Waterproofing and Damp-proofing

RSOS Sub-task		NSCS Unit	
14.02	Applies protection layer.	RFG-235	Waterproofing and Damp-proofing
Task 15, Assesses roof condition			
15.01	Performs roof inspections.	RFG-335	Roof Maintenance and Repair
15.02	Performs cut test.	RFG-335	Roof Maintenance and Repair
15.03	Determines maintenance or repair required.	RFG-335	Roof Maintenance and Repair
Task 16, Maintains and repairs low slope roofing			
16.01	Maintains low slope roofing.	RFG-225	Low Slope Roofs
		RFG-320	Roof Maintenance and Repair
16.02	Repairs low slope roofing.	RFG-225	Low Slope Roofs
		RFG-320	Roof Maintenance and Repair
Task 17, Maintains and repairs steep slope roofing			
17.01	Maintains steep slope roofing.	RFG-150	Asphalt Shingles
		RFG-230	Wood and Composite Shingles
		RFG-305	Steep Slope Roofs
		RFG-310	Metal Shingles
		RFG-315	Tiled Roofs
		RFG-320	Pre-formed Metal Roofing
		RFG-335	Roof Maintenance and Repair
17.02	Repairs steep slope roofing.	RFG-150	Asphalt Shingles
		RFG-230	Wood and Composite Shingles
		RFG-305	Steep Slope Roofs
		RFG-310	Metal Shingles
		RFG-315	Tiled Roofs
		RFG-320	Pre-formed Metal Roofing
		RFG-335	Roof Maintenance and Repair

Level 1
7 Weeks (210 hours)

RFG-100 Safety (12 hrs)

Learning Outcomes

- Demonstrate knowledge maintaining a safe work environment.
- Demonstrate knowledge of PPE and safety equipment, their applications, maintenance and procedures for use.
- Demonstrate knowledge of regulatory regulations pertaining to PPE and safety.

Red Seal Occupational Standard Reference

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

Suggested Hours

12 hours

Objectives and Content

1. Define terminology associated with PPE and safety equipment.
2. Identify hazards and describe safe work practices and equipment.
    i) personal
        - falls
        - personal apparel
        - medical conditions
        - burns
        - lacerations
        - weather
        - lifting
        - lack of sleep
        - working under the influence of alcohol/drugs
    ii) workplace
        - fire
        - electrical
        - confined space (awareness)
        - lockout/tag out
        - heights
        - spills
        - faulty equipment

- debris
- obstructions
- hazardous/flammable material
- weather
- asbestos

3. Identify classes of fire and describe fire control equipment and procedures.

4. Identify and interpret health and safety regulations.
   i) Occupational Health and Safety (OHS)
   ii) Workplace Hazardous Materials Information System (WHMIS)
   iii) jurisdictional safety regulations

5. Identify training requirements for PPE and safety equipment.

6. Identify training and certification requirements for torch safety.
   i) National Torch Safety Program

7. Describe roles and responsibilities of employers and employees pertaining to the selection and use of PPE and safety equipment.

8. Identify types of personal protective equipment (PPE) and describe their applications, limitations and procedures for use.
   i) hardhats
   ii) eye and face protection
   iii) respiratory protection
   iv) hearing protection
   v) long-sleeved shirts
   vi) hand protection
   vii) foot protection
   viii) weather-appropriate clothing
   ix) cuff-less pants

9. Identify types of safety equipment and describe their applications and procedures for use.
   i) water hoses
   ii) fire extinguishers
   iii) safety cones
   iv) caution tape
   v) safety fence
   vi) warning (bump) lines
   vii) guardrails (permanent and temporary)
   viii) first aid kits
   ix) eye wash stations

x) fall protection equipment

10. Describe the importance of identifying location of safety equipment and muster points.

11. Describe the procedures used to inspect, maintain and store PPE and safety equipment.

12. Describe the procedures used to protect the public and work areas.
    i) warning lines and barricades
    ii) signage
    iii) tarps and protective coverings

13. Describe the importance of good housekeeping practices.

Practical Objectives

N/A

RFG-105 Tools and Equipment (15 hrs)

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.
- Demonstrate knowledge of hot-air welding, induction and fuelled equipment and their applications.
- Demonstrate knowledge of basic motorized equipment and their applications.

Red Seal Occupational Standard Reference

2.01 Maintains tools and equipment.
2.02 Uses power tools, pneumatic tools, hot-air welding, induction and fuelled and equipment.
2.06 Uses motorized equipment. (Introduction)

Suggested Hours:

15 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. Identify types of power tools and equipment and describe their applications and procedures for use.
   i) electric/battery
   ii) pneumatic
   iii) stationary

6. Identify types of powder-actuated tools and equipment and describe their applications.

7. Identify types of measuring and layout tools and equipment, and describe their applications and procedures for use.

8. Identify types of hot-air welding, induction and fuelled equipment and describe their applications.

9. Identify types of basic motorized equipment and describe their applications and procedures for use.
   i) sweepers
   ii) wheelbarrows
   iii) cutters
   iv) sputters

10. Describe the procedures used to inspect, maintain and store hand tools.

11. Describe the procedures used to inspect, maintain and store power tools and equipment.

12. Describe the procedures used to inspect, maintain and store measuring and layout tools and equipment.

13. Describe the procedures used to inspect, maintain and store basic motorized equipment.

Practical Objectives

N/A

RFG-110 Kettles and Burners (18 hrs)

Learning Outcomes

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

Red Seal Occupational Standard Reference

2.05 Uses hot process equipment.
3.05 Positions equipment and material on the ground and on roof.

Suggested Hours

18 hours

Objectives and Content

1. Define terminology associated with kettles and burners.

2. Identify hazards and describe safe work practices pertaining to kettles and burners.

3. Interpret standards and regulations pertaining to kettles and burners.
   i) training and certification
   ii) handling and storage

4. Identify types of tools and equipment pertaining to the use of kettles and burners and describe their applications and procedures for use.

5. Identify types of kettles and describe their applications and applications.

6. Identify types of propane and describe their applications.
   i) liquid
   ii) vapour

7. Identify types of burners and describe their applications and procedures for use.

8. Identify the components of a torch assembly.

9. Identify safe torching techniques and describe their associated procedures.

10. Describe the procedures used to set-up and operate kettles.

11. Describe the procedures used to connect and disconnect burner.

12. Describe the procedures used to set-up and operate burners.

13. Describe the procedures used to monitor propane pressure and adjust burner flame.

14. Describe the procedures used to inspect, maintain and store kettles.

15. Describe the procedures used to inspect, maintain and store propane.

16. Describe the procedures used to inspect, maintain and store burners.

17. Describe the procedures used to perform a post-job fire watch.

Practical Objectives

N/A

RFG-115 Blueprints and Drawings (21 hrs)

Learning Outcomes

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

Red Seal Occupational Standard Reference

3.02 Interprets blueprints and drawings.

Suggested Hours

21 hours

Objectives and Content

1. Define terminology associated with blueprints and 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 blueprints and drawings and describe their components and applications.
   - i) types
     - digital

- paper
- shop/detail
- sketches
- as-builts

ii) major components
- architectural
- structural
- electrical
- mechanical

iii) minor components
- cross-section
- plans
- elevations
- details

6. Identify and interpret information found on blueprints and drawings.
   i) lines
   ii) legend
   iii) section and detail views
   iv) elevations
   v) notes and specifications
   vi) symbols and abbreviations
   vii) schedules
   viii) scales

7. Demonstrate basic sketching techniques.

Practical Objectives

N/A

RFG-120 Communication and Trade Documentation (9hrs)

Learning Outcomes

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

Red Seal Occupational Standard Reference

3.01 Uses documentation and reference materials.
4.01 Uses communication techniques.

Suggested Hours

9 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) manufacturers
   vi) authorities having jurisdiction (compliance)
   vii) general public

2. Explain the coaching and mentoring relationship between journeyperson and apprentice.

3. Identify effective listening and speaking skills.

4. Describe effective conflict resolution skills.

5. Identify personal responsibilities and attitudes that contribute to on-the-job success.
   i) asking questions
   ii) working safety
   iii) accepting constructive feedback
   iv) time management and punctuality
   v) respect for authority

vi) good stewardship of materials, tools and property
vii) efficient work practice

6. Identify value of diversity in the workplace.

7. Identify communication that constitutes bullying, harassment and discrimination.
   i) Race
   ii) National or ethnic origin
   iii) Colour
   iv) Religion
   v) Age
   vi) Sex
   vii) Sexual orientation
   viii) Gender identity or expression
   ix) Marital status
   x) Family status
   xi) Disability
   xii) Genetic characteristics
   xiii) Pardoned conviction

8. 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)
      - Canadian Standards Association (CSA)
      - jurisdictional codes and regulations
   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) catalogues
   xi) work orders

Practical Objectives

N/A

RFG-125 Hoisting, Lifting and Rigging (15 hrs)

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.

Red Seal Occupational Standard Reference

2.03 Uses hoisting, lifting and rigging 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 hoisting, lifting and rigging.

2. Identify hazards and describe safe work practices pertaining to hoisting, lifting and rigging.
   i) power lines
   ii) excess loads
   iii) ground conditions
   iv) overhead
   v) environmental conditions
   vi) limitations

3. Interpret standards and regulations pertaining to hoisting, lifting and rigging.

4. Explain sling angle when preparing for hoisting, lifting and rigging operations.

5. 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 pulley
v) ladder jack
vi) ladder hoist
vii) swing hoist
viii) telehandler
ix) bottle cage
x) gravel bucket
xi) gravel hopper
xii) lifting fork

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
   xii) carabiners
   xiii) tag lines

7. Describe the procedures used to assemble and disassemble hoist frames and their components.

8. Identify types of knots, hitches and bends and describe their applications and associated procedures.

9. Describe proper lifting techniques when unloading equipment and materials.

10. Describe the procedures used to rig material and equipment for hoisting.

11. Identify methods of communication used during hoisting, lifting and rigging operations and describe their associated procedures.
   i) hand signals
   ii) electronic communications

12. Describe the procedures used to ensure work area is safe for hoisting, lifting and rigging operations.
   i) supervision of lift

ii) secure work area
iii) communication
iv) ensure safe work load (SWL)

13. Describe the procedures used to inspect, maintain and store hoisting, lifting and rigging equipment.

Practical Objectives

1. Tie knots.
2. Perform basic hand signals.

RFG-130 Access Equipment (9 hrs)

Learning Outcomes

- Demonstrate knowledge of access equipment, their applications, limitations and procedures for use.
- Demonstrate knowledge of the procedures used to use access equipment.

Red Seal Occupational Standard Reference

2.04 Uses access equipment.

Suggested Hours

9 hours

Objectives and Content

1. Define terminology associated with access equipment.

2. Identify hazards and describe safe work practices pertaining to access equipment.
   - i) power lines/overhead
   - ii) uneven surfaces
   - iii) pinch points
   - iv) trenching

3. Interpret regulations and certification requirements pertaining to access equipment.
   - i) heights
   - ii) weights
   - iii) distances/angles
   - iv) sizes

4. Interpret information pertaining to access equipment found on drawings and specifications.

5. Identify types of access equipment and describe their characteristics and applications.
   - i) scaffolds
   - ii) ladders
     - extension
     - fixed
     - step
     - fabricated

iii) aerial work platforms
iv) swing stage
v) roof brackets (ladder jacks)

6. Identify types of access equipment securement, and describe their applications.
   i) wire rope
   ii) anchors
   iii) ratchet straps
   iv) chains
   v) fasteners

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

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

Practical Objectives

N/A

RFG-135 Roofing Materials (24 hrs)

Learning Outcomes

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

Red Seal Occupational Standard Reference

Refers to many sub-tasks throughout the RSOS.

Suggested Hours

24 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 standards, 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
      - adhesives

8. Identify types of roofing systems and describe their characteristics and applications.
   i) single-ply
      - ethylene propylene diene monomer (epdm)
      - polyvinyl chloride (pvc) systems
      - thermoplastic polyolefin (tpo)
   ii) two-ply
      - modified bitumen membranes
         - hot mopped
         - torch applied
         - self-adhered
   iii) built up roofs (BUR) systems

9. Identify types of roof coatings and describe their characteristics and applications.
   i) fibrated
   ii) non-fibrated
   iii) rubberized

Practical Objectives

N/A

RFG-140 Introduction to Roof Structures and Components (18 hrs)

Learning Outcomes

- Demonstrate knowledge of roof structures and designs.
- Demonstrate knowledge of roofing components and their applications.
- Demonstrate knowledge of basic roof slope calculations.
- Demonstrate knowledge of the procedures to install underlayment.

Red Seal Occupational Standard Reference

Task 7 Applies low slope roofing components. (Introduction of components)
Task 9 Performs common steep slope practices. (Introduction of components)
9.01 Installs steep slope underlayment.

Suggested Hours

18 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 slope

3. Identify roofing 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) underlayment
   - ix) support panels
   - x) vapour barriers
   - xi) air barriers
   - xii) insulation
   - xiii) cover boards

xiv) drains, vents, curbs and penetrations
xv) temporary seals and drains
xvi) flashings
- vent
- metal
- membrane
xvii) saddles/crickets

4. Explain how roofing components work together to optimize the energy efficiency of buildings.

5. Describe roof slopes.
i) ratio/pitch
ii) rise to run
iii) slope percentage

Practical Objectives

N/A

RFG-145 Worksite Preparation (24 hrs)

Learning Outcomes

- Demonstrate knowledge of the procedures to prepare a worksite.
- Demonstrate knowledge of estimating quantities of material.
- Demonstrate knowledge of the procedures to assess worksite conditions.
- Demonstrate knowledge of the procedures to perform a worksite hazard assessment.

Red Seal Occupational Standard Reference

3.01 Uses documentation and reference materials.
3.02 Interprets blueprints and drawings.
3.04 Assesses worksite conditions
3.05 Positions equipment and material on the ground and on the roof.
3.06 Prepares material disposal systems.
5.01 Protects surrounding area.
5.02 Removes loose debris.
5.03 Removes roofing and flashing.
6.02 Cleans surface of deck.
6.04 Dries deck.
9.01 Installs steep slope underlayment.

Suggested Hours

24 hours

Objectives and Content

1. Identify sources of information relevant to worksite preparation.
   i) documentation
   ii) drawings
   iii) related professionals
   iv) clients

2. Identify hazards and describe safe work practices pertaining to worksite preparation.

3. Interpret standards and regulations pertaining to worksite preparation.
   i) handling and storage
   ii) waste disposal

4. Identify tools and equipment used to prepare the worksite and describe their applications and procedures for use.

5. Describe the procedures used to 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

6. Describe the procedures used to determine access and egress requirements of work area.

7. Describe the procedures used to identify and document pre-existing conditions.
   i) broken windows
   ii) stains
   iii) spills
   iv) damaged siding
   v) interior damage
   vi) location of mechanical components
   vii) location of electrical components

8. Describe the procedures used to determine starting and finishing points.

9. Describe the procedures used to assess worksite conditions for hazards, problems and unsafe areas.
   i) hazards
      - high traffic areas
      - un-level ground
      - overhead powerlines
      - heavy equipment
      - other trades activities
      - mechanical and electrical components
      - insects and pest animals
   ii) problems and unsafe areas
      - windows
      - skylights
      - mechanical equipment
      - air intakes
      - uncovered openings

10. Describe the procedures used to perform a worksite hazard assessment.

11. Describe the procedures used to determine fall protection requirements.
   i) scaffolds

ii) safety railings
iii) control zones
iv) harness
v) lanyard
vi) rope grab
vii) anchors systems

12. Describe onsite utility requirements.
    i) water and electrical outlets
    ii) washroom facilities
    iii) first aid stations

13. Describe waste management and material disposal requirements.
    i) hazardous material
    ii) recycling
    iii) garbage/disposal systems

14. Describe the procedures used to receive and document receipt of materials and supplies at the worksite.

15. Describe the procedures used to organize and store tools, equipment and materials at the worksite.
    i) load/unload truck and sort materials and supplies
    ii) position equipment and materials on roof
        - weight distribution
        - strategic sequence
        - ventilation openings
    iii) secure and cover equipment and materials on roof and ground
        - tarps
        - polyethylene
        - nets
        - plywood

16. Describe the procedures used to prepare roof decks.
    i) protect surrounding area
    ii) remove loose debris
    iii) remove existing roofing and flashings
    iv) clean and dry deck
    v) install underlayment

Practical Objectives

N/A

RFG-150 Asphalt Shingles (9 hrs)

Learning Outcomes

- Demonstrate knowledge of asphalt shingles, their characteristics and applications.
- Demonstrate knowledge of the procedures to install asphalt shingles.
- Demonstrate knowledge of basic maintenance and repair of asphalt shingles.

Red Seal Occupational Standard Reference

10.01	Determines layout of shingles.
10.02	Installs starter strip and starter course.
10.03	Fastens shingles.
10.04	Cuts shingles.
10.05	Tabs shingles.
10.06	Installs metal flashings for shingled roofs.
17.01	Maintains steep slope roofing.
17.02	Repairs steep slope roofing.

Suggested Hours

9 hours

Objectives and Content

1. Define terminology associated with asphalt shingles.

2. Identify hazards and describe safe work practices pertaining to the installation of asphalt shingles.

3. Interpret standards, codes and regulations pertaining to the installation of asphalt shingles.

4. Identify types of tools and equipment pertaining to the installation of asphalt shingles and describe their applications and procedures for use.

5. Identify types of asphalt shingles and describe their characteristics and applications.
   i) three tab
   ii) architectural

6. Describe factors to consider when applying asphalt shingles.
    i) layout sequence
    ii) material types and compatibility
    iii) starter strip and starter course
    iv) fasteners and adhesives
    v) cutting techniques
    vi) weather proofing
    vii) valleys

7. Describe the procedures used to install asphalt shingles.

8. Describe the procedures used to install metal flashings for asphalt shingled roofs.

9. Describe basic maintenance and repair of asphalt shingled roofs.

Practical Objectives

1. Install asphalt shingles.

RFG-155 Built-up Roofing (BUR) Membranes (30 hrs)

Learning Outcomes

- Demonstrate knowledge of roof membranes and their applications.
- Demonstrate knowledge of the procedures to install built-up roofing (BUR) membranes.

Red Seal Occupational Standard Reference

2.05 Uses hot process equipment.
8.02 Sets membranes.
8.03 Applies membranes using hot-liquid process.
8.04 Applies membranes using torched-on method.
8.05 Applies membranes using hot-air welding.
8.06 Applies membranes using cold-applied methods.
8.07 Applies membranes using mechanical fasteners.
8.10 Applies membrane flashings.
8.11 Installs temporary seals and temporary drains.

Suggested Hours

30 hours

Objectives and Content

1. Define terminology associated with BUR membranes.

2. Identify hazards and describe safe work practices pertaining to BUR membranes.

3. Interpret standards, codes and regulations pertaining to BUR membranes.

4. Interpret information pertaining to BUR membranes found on drawings and specifications.

5. Identify tools and equipment relating to the installation of BUR membranes and describe their applications and procedures for use.

6. Identify roof membrane systems and describe their applications.
   i) built up roof (BUR)
   ii) modified bitumen

iii) cold process
iv) hot rubberized
v) thermoplastics
vi) thermosets
vii) liquid-applied/coatings

7. Identify methods to install BUR membranes and describe their associated procedures.
   i) cold process
   ii) hot liquid process
   iii) hot asphalt

8. Describe the procedures used to install BUR membrane flashings.

9. Describe the procedures used to install BUR temporary seals and drains.

Practical Objectives

1. Instructor demonstration of ply application.

MENT-700 Mentoring I (6 hrs)

Learning Outcomes:

- Demonstrate knowledge of effective communication practices as a learner.
- Demonstrate knowledge of strategies for learning skills in the workplace.

Red Seal Occupational Standard Reference:

4.02 Uses mentoring techniques

Suggested Hours:

6 hours

Learning Objectives:

1. Describe the importance of one's own individual experiences.
2. Identify behaviours that demonstrate positive learning experiences.
3. Identify the benefits of workplace mentoring for the apprentice, mentor, and employer.
4. Identify the partners involved in apprenticeship training.
5. Describe the shared responsibilities for workplace learning in apprenticeship.
6. Identify different learning needs and strategies to address challenges or barriers in the workplace.
   i) learning disabilities
   ii) language
   iii) underrepresentation
7. Identify the components that create a positive and inclusive workplace culture.
   i) workplace characteristics
   ii) individual behaviours
8. Identify various learning styles and determine one's own learning preferences.
9. Explain how learning preferences impact learning new skills.
10. Identify different learning strategies to meet individual learning needs.

11. Describe the importance of adapting to a variety of teaching and learning methods in the workplace.

12. Identify techniques for effective communication as a learner.
    i) verbal and non-verbal
    ii) active listening

13. Identify and describe personal responsibilities and attitudes that contribute to on-the-job success.
    i) self advocating
    ii) asking questions
    iii) accepting constructive feedback
    iv) working safely
    v) employing time management techniques and being punctual

Level 2
6 Weeks (180 hours)

RFG-200 Fasteners, Adhesives and Sealants (24 hrs)

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.

Red Seal Occupational Standard Reference

8.07 Applies membranes using mechanical fasteners.

Suggested Hours

24 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 standards and codes 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
   ii) screws
   iii) bolts
   iv) clips
   v) plates
   vi) anchors
   vii) bars
   viii) staples
   ix) rivets

6. 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

7. Identify types of sealants and describe their characteristics and applications.
   i) mastic
   ii) caulking

8. Describe the procedures used to install and remove fasteners.

9. Describe the procedures used to apply and remove adhesives.

10. Describe the procedures used to apply and remove sealants.

Practical Objectives

N/A

RFG-205 Motorized Equipment (15 hrs)

Learning Outcomes

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

Red Seal Occupational Standard Reference

2.06 Uses motorized equipment.
3.05 Positions equipment and material on the ground and on the roof.

Suggested Hours

15 hours

Objectives and Content

1. Define terminology associated with motorized equipment.

2. Identify hazards and describe safe work practices pertaining to motorized equipment.
   - i) loose nuts and bolts
   - ii) exposed cutting blades
   - iii) damaged guards
   - iv) belts and chains
   - v) fractured housings and frames
   - vi) worn brakes and engine parts
   - vii) fuel

3. Interpret standards, regulations and certification requirements pertaining to the use of motorized equipment.

4. Identify types of motorized 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 moppers
ix) spudders
x) automated seamers
xi) felt layers

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

Practical Objectives

N/A

RFG-210 Roof Deck Preparation (48 hrs)

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.

Red Seal Occupational Standard Reference

3.04 Assesses worksite conditions.
3.05 Positions equipment and material on the ground and on the roof.
3.06 Prepares material disposal systems.
5.01 Protects surrounding area.
5.02 Remove loose debris.
5.03 Remove roofing and flashings.
5.04 Prepares roof substrate.
5.05 Performs minor adjustments to penetrations, curbs and parapets.
6.01 Inspects deck.
6.02 Cleans surface of deck.
6.03 Verifies placement of roof penetrations, curbs and parapets.
6.04 Dries deck.
8.11 Installs temporary seals and temporary drains.

Suggested Hours

48 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 standards, 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) position equipment and material on the ground and on the roof.
   iii) remove loose debris
   iv) remove damaged or deteriorated roofing
   v) remove flashings
   vi) prepare roof substrate
   vii) perform minor adjustments to height of penetrations and parapets
   viii) install water cut-offs, temporary seals and temporary drains
   ix) clean up and dispose of waste

10. Describe the procedures used to prepare a deck for new roof installation.
   i) assess and protect surrounding area
   ii) position equipment and material on the ground and on the roof.
   iii) inspect deck
   iv) clean deck

v) verify placement of roof penetrations, curbs and parapets
vi) dry deck

11. Identify factors to consider when preparing a deck in the winter.

Practical Objectives

N/A

RFG-215 Modified Bitumen Membranes (15 hrs)

Learning Outcomes

- Demonstrate knowledge of modified bitumen membranes and their applications.
- Demonstrate knowledge of the procedures to install modified bitumen membranes.

Red Seal Occupational Standard Reference

2.05 Uses hot process equipment.
8.01 Relaxes membranes.
8.02 Sets membranes.
8.03 Applies membranes using hot-liquid process.
8.04 Applies membranes using torched-on method.
8.05 Applies membranes using hot-air welding.
8.06 Applies membranes using cold-applied methods.
8.07 Applies membranes using mechanical fasteners.
8.10 Applies membrane flashings.
8.11 Installs temporary seals and temporary drains.

Suggested Hours

15 hours

Objectives and Content

1. Define terminology associated with modified bitumen membranes.

2. Identify hazards and describe safe work practices pertaining to modified bitumen membranes.

3. Interpret standards, codes and regulations pertaining to modified bitumen membranes.

4. Interpret information pertaining to modified bitumen membranes found on drawings and specifications.

5. Identify tools and equipment relating to the installation of modified bitumen membranes and describe their applications and procedures for use.

6. Identify roof membrane systems and describe their applications.
    i) built up roof (BUR)
    ii) modified bitumen
    iii) cold process
    iv) hot rubberized
    v) thermoplastics
    vi) thermosets
    vii) liquid applied/coatings

7. Identify methods to install modified bitumen membranes and describe their associated procedures.
    i) hot asphalt
    ii) self-adhered
    iii) torched on
    iv) mechanically fastened

8. Describe the procedures used to install modified bitumen membrane flashings.

9. Describe the procedures used to install modified bitumen temporary seals and drains.

Practical Objectives

1. Relax and set membranes.
2. Apply membranes using hot-air and/or torch-applied methods.

RFG-220 Cold Process and Hot Rubberized Membranes (12 hrs)

Learning Outcomes

- Demonstrate knowledge of cold process membranes and their applications.
- Demonstrate knowledge of hot rubberized membranes and their applications.
- Demonstrate knowledge of the procedures to install cold process membranes.
- Demonstrate knowledge of the procedures to install hot rubberized membranes.

Red Seal Occupational Standard Reference

2.05 Uses hot process equipment.
8.01 Relaxes membranes.
8.02 Sets membranes.
8.03 Applies membranes using hot-liquid process.
8.05 Applies membranes using hot-air welding.
8.06 Applies membranes using cold-applied methods.
8.10 Applies membrane flashings.

Suggested Hours

12 hours

Objectives and Content

1. Define terminology associated with cold process and hot rubberized membranes.

2. Identify hazards and describe safe work practices pertaining to cold process and hot rubberized membranes.

3. Interpret standards, codes and regulations pertaining to cold process and hot rubberized membranes.

4. Interpret information pertaining to cold process and hot rubberized membranes found on drawings and specifications.

5. Identify tools and equipment relating to the installation of cold process and hot rubberized membranes and describe their applications and procedures for use.

6. Identify roof membrane systems and describe their applications.
    i) built up roof (BUR)
    ii) modified bitumen
    iii) cold process
    iv) hot rubberized
    v) Thermoplastics
    vi) Thermosets
    vii) Liquid applied/coatings

7. Identify methods to install cold process membranes and describe their associated procedures.
    i) squeezees
    ii) mops
    iii) notched trowels

8. Identify methods to install hot rubberized membranes and describe their associated procedures.
    i) squeezees
    ii) mops
    iii) notched trowels

9. Describe the procedures used to install cold process membrane flashings.

Practical Objectives

1. Instructor demonstration or video of cold process membranes.

2. Instructor demonstration or video of hot rubberized membranes.

RFG-225 Low Slope Roofs (42 hrs)

Learning Outcomes

- Demonstrate knowledge of low slope roofs and their components.
- Demonstrate knowledge of the procedures to install low slope roofing components.
- Demonstrate knowledge of basic maintenance and repair of low slope roofing components.

Red Seal Occupational Standard Reference

7.01 Installs support panels.
7.02 Primes substrate.
7.03 Applies vapour retarder, vapour barrier and air barrier.
7.04 Installs insulation.
7.05 Installs cover board.
7.06 Installs drains, vents, curbs and penetrations.
7.07 Applies ballast, walkways and protective surfaces.
7.08 Installs metal flashings.
16.01 Maintains low slope roofing.
16.02 Repairs low slope roofing.

Suggested Hours

42 hours

Objectives and Content

1. Define terminology associated with low slope roofs.

2. Identify hazards and describe safe work practices pertaining to low slope roofs.

3. Interpret standards, codes and regulations pertaining to low slope roofs.

4. Interpret information pertaining to low slope roofs found on drawings and specifications.

5. Identify tools and equipment pertaining to the installation of low slope roofing components and describe their applications and procedures for use.

6. Identify types of low slope roofing systems and describe their characteristics and applications.
   - i) inverted roof membrane assembly (IRMA)
   - ii) butterfly

7. Identify low slope roofing components and describe their characteristics and applications.
   - i) support panels/levellers
     - gypsum products
     - sheeting boards
   - ii) primers
     - water-based
     - solvent-based
   - iii) vapour retarders, vapour barriers and air barriers
   - iv) insulation
     - polystyrene (expanded and extruded)
     - polyisocyanunate
     - 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. Describe the procedures used to calculate material requirements.

9. Describe the procedures used to install support panels/levellers.

10. Describe the procedures used to prime substrates.

11. Describe the procedures used to apply vapour barrier and air barrier.

12. Describe the procedures used to install insulation.

13. Describe the procedures used to install cover board.

14. Describe the procedures used to install drains, vents, curbs and penetrations.

15. Describe the procedures used to install ballast, walkways and protective surfaces.

16. Describe the procedures used to install metal flashings.

17. Describe basic maintenance and repair of low slope roofing components.

Practical Objectives

N/A

RFG-230 Wood and Composite Shingles (6 hrs)

Learning Outcomes

- Demonstrate knowledge of wood and composite shingles, their characteristics and applications.
- Demonstrate knowledge of the procedures to install wood and composite shingles.
- Demonstrate knowledge of basic maintenance and repair of wood and composite shingles.

Red Seal Occupational Standard Reference

10.01	Determines layout of shingles.
10.02	Installs starter strip and starter course.
10.03	Fastens shingles.
10.04	Cuts shingles.
10.06	Installs metal flashings for shingled roofs.
17.01	Maintains steep slope roofing.
17.02	Repairs steep slope roofing.

Suggested Hours

6 hours

Objectives and Content

1. Define terminology associated with wood and composite shingles.

2. Identify hazards and describe safe work practices pertaining the installation of wood and composite shingles.

3. Interpret standards, codes and regulations pertaining to the installation of wood and composite shingles.

4. Identify types of tools and equipment pertaining to the installation of wood and composite shingles and describe their applications and procedures for use.

5. Identify types of wood and composite shingles and describe their characteristics and applications.
   i) wood

- shakes
- shingles

ii) composite

6. Describe factors to consider when applying wood and composite shingles.
   i) layout sequence
   ii) material types and compatibility
   iii) starter strip and starter course
   iv) fasteners and adhesives
   v) cutting techniques
   vi) weather proofing
   vii) valleys

7. Describe the procedures used to install wood and composite shingles.

8. Describe the procedures used to install metal flashings for wood and composite shingled roofs.

9. Describe basic maintenance and repair of wood and composite shingled roofs.

Practical Objectives

1. Install wood and/or composite shingles.

RFG-235 Waterproofing and Damp-Proofing (18 hrs)

Learning Outcomes

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

Red Seal Occupational Standard Reference

13.01 Prepares waterproofing substrates.
13.02 Applies waterproofing membrane.
14.01 Applies coatings.
14.02 Applies protection layer.

Suggested Hours

18 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 standards, 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 methods used to apply coatings and describe their associated procedures.
    i) spraying
    ii) brushing
    iii) rolling
    iv) trowelling

Practical Objectives

1. Instructor demonstration or video of damp-proofing.

Level 3
6 Weeks (180 hours)

RFG-300 Thermoplastic, Thermoset & Liquid-applied Membranes (24 hrs)

Learning Outcomes

- Demonstrate knowledge of thermoplastic, thermoset and liquid-applied membranes and their applications.
- Demonstrate knowledge of the procedures to install thermoplastic membranes.
- Demonstrate knowledge of the procedures to install thermoset membranes.
- Demonstrate knowledge of the procedures to install liquid-applied membranes/coatings.

Red Seal Occupational Standard Reference

2.05 Uses hot process equipment.
8.01 Relaxes membranes.
8.02 Sets membranes.
8.03 Applies membranes using hot-liquid process.
8.05 Applies membranes using hot-air welding.
8.06 Applies membranes using cold-applied methods.
8.07 Applies membranes using mechanical fasteners.
8.08 Applies loose-laid membranes.
8.09 Applies liquid-applied membranes.
8.10 Applies membrane flashings.
8.11 Installs temporary seals and temporary drains.

Suggested Hours

24 hours

Objectives and Content

1. Define terminology associated with thermoplastic, thermoset and liquid-applied membranes.

2. Identify hazards and describe safe work practices pertaining to thermoplastic, thermoset and liquid-applied membranes.

3. Interpret standards, codes and regulations pertaining to thermoplastic, thermoset and liquid-applied membranes.

4. Interpret information pertaining to thermoplastic, thermoset and liquid-applied membranes found on drawings and specifications.

5. Identify tools and equipment relating to the installation of thermoplastic, thermoset and liquid-applied membranes and describe their applications and procedures for use.

6. Identify roof membrane systems and describe their applications.
   - i) built up roof (BUR)
   - ii) modified bitumen
   - iii) cold process
   - iv) hot rubberized
   - v) thermoplastics
   - vi) thermosets
   - vii) liquid-applied/coatings

7. Identify types of liquid-applied membranes/coatings and describe their applications.
   - i) polymethyl-methacrylate (PMMA)
   - ii) epoxy
   - iii) polyurethane

8. Identify methods to install thermoplastic membranes and describe their associated procedures.
   - i) loose-laid and ballasted
   - ii) mechanically fastened
   - iii) fully adhered

9. Identify methods to install thermoset membranes and describe their associated procedures.
   - i) hot asphalt (historical)
   - ii) mechanically fastened
   - iii) fully adhered
   - iv) loose-laid and ballasted

10. Identify methods to install liquid-applied membranes and describe their associated procedures.
    - i) sprayer
    - ii) squeegee
    - iii) roller

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

12. Describe the procedures used to install thermoplastic and thermoset membrane flashings.

13. Describe the procedures used to install thermoplastic and thermoset temporary seals and drains.

Practical Objectives

1. Relax and set membranes.
2. Apply seam tape to thermosets.
3. Apply membranes using hot-air methods.

RFG-305 Steep Slope Roofs (21 hrs)

Learning Outcomes

- Demonstrate knowledge of steep slope roofs and their components.
- Demonstrate knowledge of the procedures to install steep slope roof components.
- Demonstrate knowledge of basic maintenance and repair of steep slope roofing components.

Red Seal Occupational Standard Reference

9.01 Installs steep slope underlayment.
9.02 Installs steep slope venting.
9.03 Installs steep slope valley applications.
9.04 Installs steep slope saddles/crickets.
8.05 Installs steep slope penetration flashings.
17.01 Maintains steep slope roofing.
17.02 Repairs steep slope roofing.

Suggested Hours

21 hours

Objectives and Content

1. Define terminology associated with steep slope roofs.

2. Identify hazards and describe safe work practices pertaining to steep slope roofs.

3. Interpret standards, codes and regulations pertaining to steep slope roofs.

4. Interpret information pertaining to steep slope roofs found on drawings and specifications.

5. Identify tools and equipment relating to the installation of steep slope roof components and describe their applications and procedures for use.

6. Identify steep slope roof components and describe their characteristics and applications.
   i) underlayment

ii) venting
iii) valley applications
iv) saddles/crickets
v) penetration flashings

7. Describe the procedures used to calculate material requirements.

8. Describe the procedures used to install steep slope underlayment.

9. Describe the procedures used to install steep slope venting.

10. Describe the procedures used to install steep slope valley applications.

11. Describe the procedures used to install steep slope saddles/crickets.

12. Describe the procedures used to install steep slope penetration flashings.

13. Describe basic maintenance and repair procedures of steep slope roofing components.

Practical Objectives

N/A

RFG-310 Metal Shingles (9 hrs)

Learning Outcomes

- Demonstrate knowledge of metal shingles, their characteristics and
- applications.
- Demonstrate knowledge of the procedures to install metal shingles.
- Demonstrate knowledge of basic maintenance and repair of metal shingles.

Red Seal Occupational Standard Reference

10.01	Determines layout of shingles.
10.02	Installs starter strip and starter course.
10.03	Fastens shingles.
10.04	Cuts shingles.
10.06	Installs metal flashings for shingled roofs.
17.01	Maintains steep slope roofing.
17.02	Repairs steep slope roofing.

Suggested Hours

9 hours

Objectives and Content

1. Define terminology associated with metal shingles.

2. Identify hazards and describe safe work practices pertaining the installation of metal shingles.

3. Interpret standards, codes and regulations pertaining to the installation of wood and composite shingles.

4. Interpret information pertaining to the installation of wood and composite shingles found on drawings and specifications.

5. Identify types of tools and equipment pertaining to the installation of metal shingles and describe their applications and procedures for use.

6. Identify types of metal shingles and describe their characteristics and applications.

7. Describe factors to consider when installing metal shingles.
    i) Layout sequence
    ii) Substrate requirements
    iii) Material types and compatibility
    iv) Starter strip and starter course
    v) Fasteners and adhesives
    vi) Cutting techniques
    vii) Weather proofing
    viii) Valleys

8. Describe the procedures used to install metal shingles.

9. Describe the procedures used to install metal flashings for metal shingled roofs.

10. Describe basic maintenance and repair of metal shingled roofs.

Practical Objectives

N/A

RFG-315 Roof Tiles (9hrs)

Learning Outcomes

- Demonstrate knowledge of roof tiles, their characteristics and
- applications.
- Demonstrate knowledge of the procedures to install roof tiles.
- Demonstrate knowledge of basic maintenance and repair of roof tiles.

Red Seal Occupational Standard Reference

11.01	Installs battens/strapping for roof tiles.
11.02	Fastens roof tiles.
11.03	Cuts roof tiles.
11.04	Installs closure strips for roof tiles.
11.05	Installs ridge and hip caps.
11.06	Installs metal flashings for tiled roofs.
17.01	Maintains steep slope roofing.
17.02	Repairs steep slope roofing.

Suggested Hours

9 hours

Objectives and Content

1. Define terminology associated with roof tiles.

2. Identify hazards and describe safe work practices pertaining the installation of roof tiles.

3. Interpret standards, codes and regulations pertaining to the installation of roof tiles.

4. Identify types of tools and equipment pertaining to the installation of roof tiles and describe their applications and procedures for use.

5. Identify types of roof tiles and describe their characteristics and applications.
   - i) clay
   - ii) concrete
   - iii) slate
   - iv) metal

6. Describe factors to consider when installing roof tiles.
    i) layout sequence
    ii) substrate requirements
    iii) material types and compatibility
    iv) fasteners and adhesives
    v) cutting techniques
    vi) battens/strapping
    vii) closure strips
    viii) ridge and hip caps
    ix) weather proofing
    x) valleys

7. Describe the procedures used to install roof tiles.

8. Describe the procedures used to install metal flashings for tiled roofs.

9. Describe basic maintenance and repair of tiled roofs.

Practical Objectives

N/A

RFG-320 Pre-formed Metal Roofing (9 hrs)

Learning Outcomes

- Demonstrate knowledge of pre-formed metal roofing, their characteristics and applications.
- Demonstrate knowledge of the procedures to install pre-formed metal roofing.
- Demonstrate knowledge of basic maintenance and repair of pre-formed metal roofs.

Red Seal Occupational Standard Reference

12.01	Installs battens/strapping for pre-formed metal roofing.
12.02	Fastens pre-formed metal roofing.
12.03	Cuts sheet metal.
12.04	Installs closure strips for pre-formed metal roofing.
12.05	Installs snow guards.
12.06	Installs metal flashings for pre-formed metal roofs.
17.01	Maintains steep slope roofing.
17.02	Repairs steep slope roofing.

Suggested Hours

9 hours

Objectives and Content

1. Define terminology associated with pre-formed metal roofing.

2. Identify hazards and describe safe work practices pertaining to the installation of pre-formed metal roofing.

3. Interpret standards, codes and regulations pertaining to the installation of pre-formed metal roofing.

4. Identify information pertaining to the installation of pre-formed metal roofing found on drawings and specifications.

5. Identify types of tools and equipment pertaining to the installation of pre-formed metal roofing and describe their applications and procedures for use.

6. Identify types of pre-formed metal roofing and describe their characteristics and applications.
    i) galvanized steel
    ii) zinc
    iii) aluminum
    iv) copper

7. Describe expansion and contraction effects of metal with changes in temperature.

8. Describe factors to consider when installing pre-formed metal roofing.
    i) layout sequence
    ii) substrate requirements
    iii) material types and compatibility
    iv) fasteners and adhesives
    v) cutting techniques
    vi) battens/strapping
    vii) closure strips
    viii) snow guards
    ix) weather proofing
    x) valleys

9. Describe the procedures used to install pre-formed metal roofing.

10. Describe the procedures used to install metal flashings for pre-formed metal roofs.

11. Describe basic maintenance and repair of pre-formed metal roofs.

Practical Objectives

N/A

RFG-325 Green Roof Waterproof Membranes (6 hrs)

Learning Outcomes

- Demonstrate knowledge of green roof systems and their characteristics.
- Demonstrate knowledge of the procedures to install green roof waterproof membranes.
- Demonstrate knowledge of basic maintenance and repair of green roof waterproof membranes.

Red Seal Occupational Standard Reference

13.03 Installs green, sustainable, vegetative and protected membrane components

Suggested Hours

6 hours

Objectives and Content

1. Define terminology associated with green roof systems.

2. Identify hazards and describe safe work practices pertaining to the installation of green roof waterproof membranes.

3. Interpret standards, codes and regulations pertaining to the installation of roof waterproof membranes.

4. Interpret information pertaining to the installation of green roof waterproof membranes found on drawings and specifications.

5. Identify tools and equipment pertaining to pertaining to the installation of green roof waterproof membranes, and describe their applications and procedures for use.

6. Explain the benefits of green roof systems.
   - i) waste diversion
   - ii) stormwater management
   - iii) cooling effect
   - iv) air quality improvement
   - v) energy efficiency
   - vi) membrane durability

vii) fire retardation

7. Identify types of green roof systems and describe their characteristics.
   i) modular
   ii) loose laid/built-up

8. Identify types of green roof membrane components and describe their characteristics and applications.
   i) root barriers
   ii) moisture retention mats
   iii) irrigation systems
   iv) growing medium
   v) vegetation

9. Identify roof's vegetative-free zones.
   i) drains
   ii) perimiter
   iii) roof penetrations
   iv) rooftop units

10. Describe the procedures used to install green waterproof membranes.

11. Identify defects and describe their causes and prevention.
   i) holes
   ii) gouges
   iii) debris
   iv) laps

12. Identify leak detection methods and describe their associated procedures.

13. Describe the procedures used to maintain and repair protection layer and waterproof membrane of a green roof system.

Practical Objectives

N/A

RFG-330 Metal Flashings (15 hrs)

Learning Outcomes

- Demonstrate knowledge of metal flashings and their applications.
- Demonstrate knowledge of the procedures to fabricate and install metal flashings for steep slope roofs.

Red Seal Occupational Standard Reference

9.05 Installs steep slope penetration flashings.

Suggested Hours

15 hours

Objectives and Content

1. Define terminology associated with metal flashings for steep slope roofs.

2. Identify hazards and describe safe work practices pertaining to fabricating and installing metal flashings for steep slope roofs.

3. Interpret standards, codes and regulations pertaining to fabricating and installing metal flashings for steep slope roofs.

4. Interpret information pertaining to fabricating and installing metal flashings for steep slope roofs found on drawings and specifications.

5. Identify tools and equipment used to fabricate and install metal flashings and describe their applications and procedures for use.

6. Explain the principles of watershed design.

7. Identify types of metal flashings for steep slope roofs and describe their characteristics and applications.
   i) aluminum
   ii) copper
   iii) stainless steel
   iv) pre-painted steel

v) galvanized

8. Describe the procedures used to calculate flashing material requirements.

9. Describe the procedures used to fabricate and install metal flashings.

Practical Objectives

N/A

RFG-335 Roof Maintenance and Repair (30 hrs)

Learning Outcomes

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

Red Seal Occupational Standard Reference

15.01 Performs roof inspections.
15.02 Performs cut test.
15.03 Determines maintenance or repair required.
16.01 Maintains low slope roofing.
16.02 Repairs low slope roofing.
17.01 Maintains steep slope roofing.
17.02 Repair steep slope roofing.

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 standards, 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 used to maintain and repair roofs and describe their applications and procedures for use.

6. Describe the procedures used to assess roof conditions and identify defects.
   i) inspection
   ii) perform 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 roof preventive maintenance procedures.

9. Describe the procedures used to repair roofs.
    i) BUR
    ii) modified bitumen
    iii) cold process
    iv) hot rubberized
    v) thermoset
    vi) thermoplastic
    vii) steep slope roofs

Practical Objectives

N/A

RFG-340 Job Planning (21 hrs)

Learning Outcomes

- Demonstrate knowledge of the procedures used to plan and organize jobs.
- Demonstrate knowledge of specialty rooftop equipment and components, their characteristics and applications.
- Demonstrate knowledge of the procedures to inspect and repair roofing assembly components.

Red Seal Occupational Standard Reference

3.02 Interprets blueprints and drawings.
3.03 Estimates material.
3.04 Assesses worksite conditions.
3.05 Positions equipment and materials on the ground and on the roof.
3.07 Evaluates roof conditions near roof-top equipment installations.
4.01 Communicates with others.

Suggested Hours

21 hours

Objectives and Content

1. Identify sources of 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) specialty rooftop equipment
v) materials
vi) waste management
vii) 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.

5. Identify types of specialty rooftop equipment and describe their characteristics and applications.
   i) cable trays
   ii) fiber optic systems
   iii) photovoltaic (PV)

6. Identify factors to consider before installation of specialty rooftop equipment.
   i) age of roof
   ii) condition of roof
   iii) hazards
   iv) moisture
   v) proximity
   vi) spacing
   vii) substrate composition
   viii) surface condition

7. Identify design enhancements that roofing assemblies used as substrates should incorporate before installation of specialty rooftop equipment.
   i) roof area drains independently and has a positive slope
   ii) increased compressive strength of insulation and cover boards
   iii) dedicated walkways installed for installation and future maintenance of rooftop systems
   iv) roof design withstands foot and equipment traffic

8. Identify types of rack-mounted system installation methods and describe their characteristics and applications.

9. Describe the procedures used to inspect roofing assembly components.

10. Describe the procedures used to repair roofing assembly components.

Practical Objectives

1. Interpret blueprints and drawings.

MENT-701 Mentoring II (6 hrs)

Learning Outcomes:

- Demonstrate knowledge of effective communication practices as a mentor.
- Demonstrate knowledge of strategies for teaching workplace skills.

Red Seal Occupational Standard Reference:

4.02 Uses mentoring techniques

Suggested Hours:

6 hours

Learning Objectives:

1. Identify the different roles played by a workplace mentor.

2. Identify strategies to create a supportive learning environment.

3. Identify techniques for effective communication as a mentor.
   i) constructive feedback
   ii) active listening
   iii) leading meetings and one-on-one sessions

4. Describe the steps in teaching a skill.
   i) identifying the point of lesson
   ii) linking the lesson
   iii) demonstrating the skill
   iv) providing practice
   v) giving feedback
   vi) assessing skill and progress

5. Identify strategies to assist in teaching a skill while meeting individual learning needs.
   i) principles of instruction
   ii) coaching skills

6. Explain how to adjust a lesson for various situations.

RFG-350 Program Review (30 hrs)

Learning Outcomes

- Demonstrate knowledge of the Red Seal Occupational Standard (RSOS) and its relationship to the Interprovincial Red Seal Examination.
- Demonstrate knowledge of overall comprehension of the trade in preparation for the Interprovincial Red Seal Examination.

Red Seal Occupational Standard Reference

Entire Red Seal Occupational Standard.

Suggested Hours

30 Hours

Theoretical Objectives

1. Define terminology associated with a Red Seal Occupational Standard (RSOS).
   - i) major work activities (MWA)
   - ii) tasks
   - iii) sub-tasks

2. Explain how a RSOS is developed and the link it has to the Interprovincial Examination.
   - i) development
   - ii) validation
   - iii) MWA and task weighting
   - iv) examination breakdown

3. Identify Red Seal products and describe their use when preparing for the Interprovincial Examination.
   - i) Red Seal website (to locate occupational standard exams are based on)
   - ii) examination preparation guide
   - iii) examination breakdown/counselling sheets
   - iv) self-assessment guides
   - v) sample questions
   - vi) preparation checklists

4. Explain the relationship between the RSOS and the Curriculum Standard.

5. Review Common Occupational Skills for the Roofer trade as identified in the RSOS.
    i) safety-related functions
    ii) tools and equipment
    iii) organizes work
    iv) communication and mentoring

6. Review process to prepare roof and deck for the Roofer trade as identified in the RSOS.
    i) replacement
    ii) installation

7. Review process to install low slope roofing for the Roofer trade as identified in the RSOS.
    i) components
    ii) membranes

8. Review process to install steep slope roofing for the Roofer trade as identified in the RSOS.
    i) common practices
    ii) shingles
    iii) roof tiles
    iv) pre-formed roofing

9. Review process to waterproof and damp-proof surfaces for the Roofer trade as identified in the RSOS.
    i) substrates
    ii) membranes
    iii) green/vegetative and protected membranes
    iv) materials
    v) protection layer

10. Review process to assess, maintain and repair roofs for the Roofer trade as identified in the RSOS.
    i) low slope roofs
    ii) steep slope roofs

Practical Objectives

N/A

Feedback and Revisions

This curriculum standard will be amended periodically; comments or suggestions for improvements should be directed to:

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Any comments or suggestions received will be reviewed and considered to determine the course of action required. If the changes are deemed to be minor, they will be held for implementation during the next review cycle. If immediate change is deemed appropriate, it will result in a revision to this version of the AACS and will be detailed in the following section.

Version Changes

Revision Date	Revision	Implementation Date
April 2022 (v 2.0)	Updated to the 2020 RSOS and National Harmonization Recommendations	2022-2023 Training Year
March 2014 (v 1.0)	Based on the New Brunswick Curriculum Standard	2014-2015 Training Year