

# Apprenticeship and Industry Training

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**Roofer**

**Curriculum Guide**

**028 (2022)**



Apprenticeship  
and Industry  
Training

**ALBERTA ADVANCED EDUCATION**

Roofer : apprenticeship education program curriculum guide

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**Roofer  
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## **Apprenticeship**

Apprenticeship is post-secondary education with a difference. Apprenticeship begins with finding a sponsor. Sponsors guide apprentices, and support on-the-job learning through provision of mentorship. Approximately 80 per cent of an apprentice's time is spent on the job under the supervision of a certified journeyperson or qualified tradesperson. The other 20 per cent involves technical training provided at, or through, a post-secondary institution (PSI) – usually a college or technical institute.

To receive their post-secondary credential, apprentices must learn theory and skills, and they must pass examinations. Criteria for the program—including the content and delivery of technical training—are developed and updated by the Registrar.

The graduate of the Roofer apprenticeship program is an individual who will be able to:

- understand the principles and practices of roofing
- know the characteristics and to understand the actions and interactions of roofing materials
- interpret plans and specifications and to layout and develop projects accordingly
- calculate material and quantities
- use hand tools and powered equipment in a proper and safe manner
- relate to the work of other tradesmen in the construction industry
- perform assigned tasks in accordance with quality and production standards required by industry

### **Apprenticeship and Industry Training System**

Alberta's apprenticeship programs are supported by industry stakeholders that ensures a highly skilled, internationally competitive workforce in the province. The Registrar establishes the educational standards and provides direction to the system supported by industry and the PSI's. The Ministry of Advanced Education provides the legislative framework and administrative support for the apprenticeship and industry training system.

**Special thanks are offered to the following industry members who contributed to the development of the standard:**

Mr. G. Bye	Calgary
Mr. C. Adam	Edmonton
Mr. L. McNichol	Calgary
Mr. P. Murphy	Calgary
Mr. G. Playsted	Calgary
Mr. C. Barnicott	Edmonton
Mr. B. Lamb	Calgary
Mr. M. Szmaj	Lethbridge

### **Alberta Government**

Alberta Advanced Education works with industry, sponsor and employee organizations and technical training providers to:

- facilitate industry's development and maintenance of training and certification standards
- provide registration and counselling services to apprentices and sponsors
- coordinate technical training in collaboration with training providers
- certify apprentices and others who meet industry standards

## **Apprentice Safety**

Safe working procedures and conditions, incident/injury prevention, and the preservation of health are of primary importance in apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of government, sponsors, employees, apprentices and the public. Therefore, it is imperative that all parties are aware of circumstances that may lead to injury or harm.

Safe learning experiences and healthy environments can be created by controlling the variables and behaviours that may contribute to or cause an incident or injury. By practicing a safe and healthy attitude, everyone can enjoy the benefit of an incident and injury free environment.

## **Occupational Health and Safety**

Persons engaged in, or supporting an individual in an experiential learning environment are often exposed to more worksite hazards than in other forms of traditional postsecondary education and therefore should be familiar with and apply the Occupational Health and Safety Act, Regulations and Code when dealing with personal safety and the special safety rules that apply to all daily tasks.

Occupational Health and Safety-OHS (a division of Alberta Labour and Immigration) conducts periodic inspections of workplaces to ensure that safety regulations for industry are being observed.

Additional information is available at [www.alberta.ca/occupational-health-safety.aspx](http://www.alberta.ca/occupational-health-safety.aspx)

## **Technical Training**

Apprenticeship technical training is delivered by the PSI's throughout Alberta. The PSI's are committed to delivering the technical training component of Alberta apprenticeship programs in a safe, efficient and effective manner. All PSI's place a strong emphasis on safety that complements safe workplace practices towards the development of a culture of safety for all professions.

The PSI's work with industry and Alberta Advanced Education to enhance access and responsiveness to industry needs through the delivery of the technical training component of apprenticeship programs across the province. They develop curriculum from the curriculum guides established by the Registrar in consultation with the PSI's and industry and provide the technical training to apprentices.

The following PSI's deliver Roofer trade apprenticeship technical training:

Northern Alberta Institute of Technology  
Southern Alberta Institute of Technology

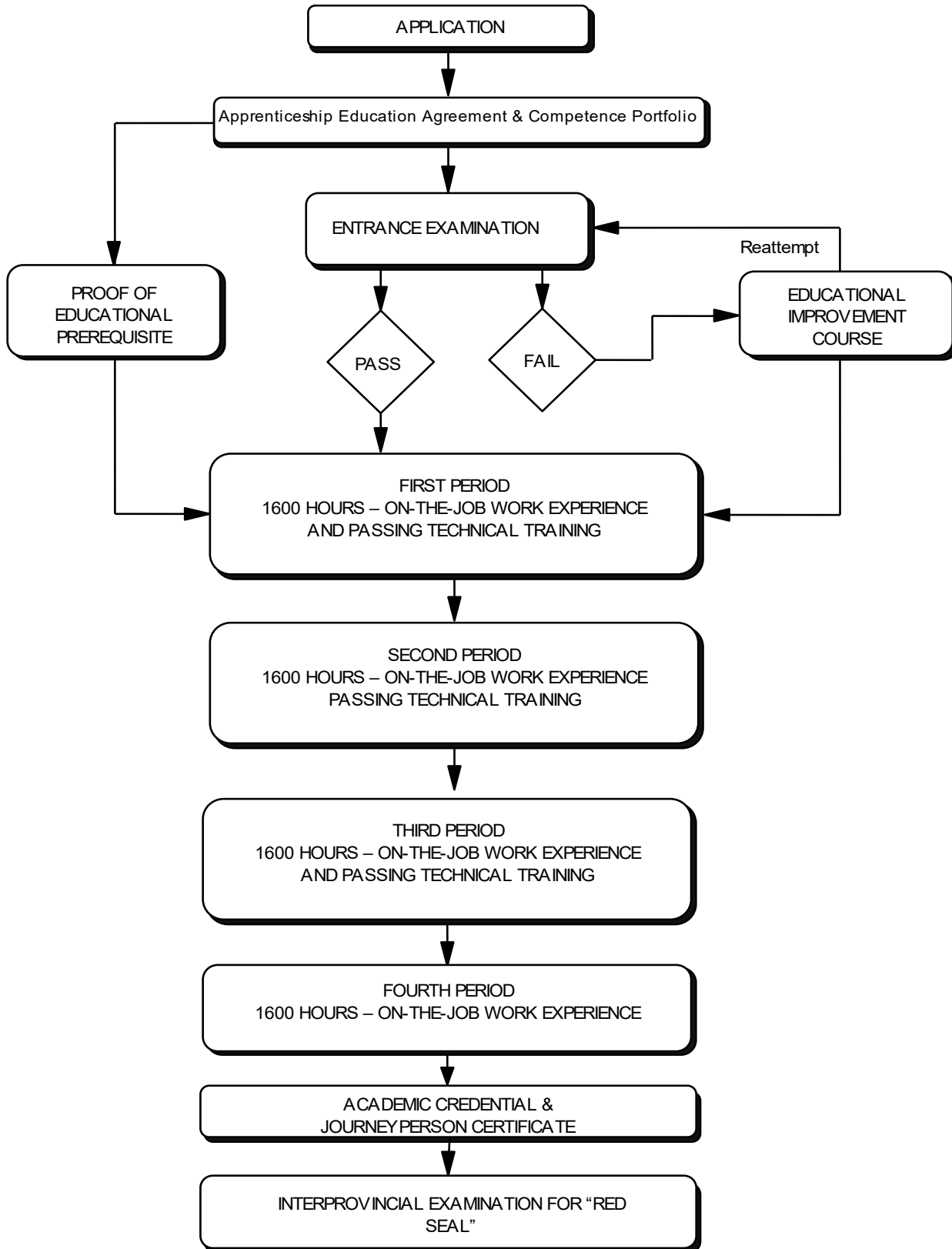
## **Procedures for Recommending Revisions to the Curriculum Guide**

Any concerned individual or group in the province of Alberta may make recommendations for change by writing to:

Registrar of Apprenticeship Programs  
c/o Apprenticeship Delivery and Industry Support Services  
Apprenticeship Delivery and Industry Support  
Advanced Education  
19th floor, Commerce Place  
10155 102 Street NW  
Edmonton AB T5J 4L5

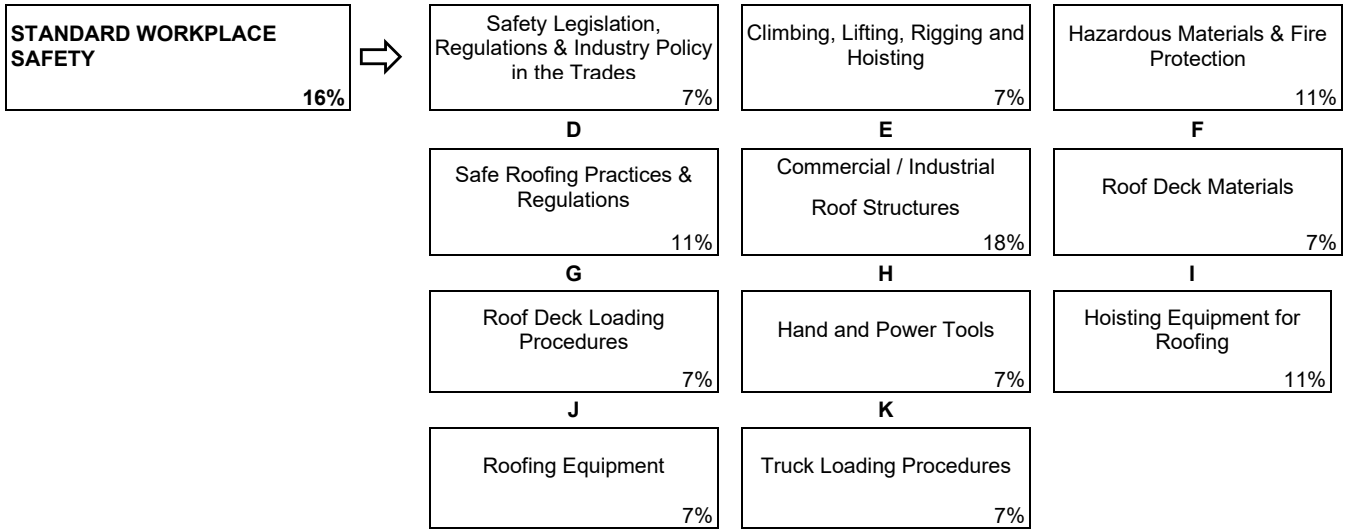
It is requested that recommendations for change refer to specific areas and state references used.

### Apprenticeship Route toward Academic Credential

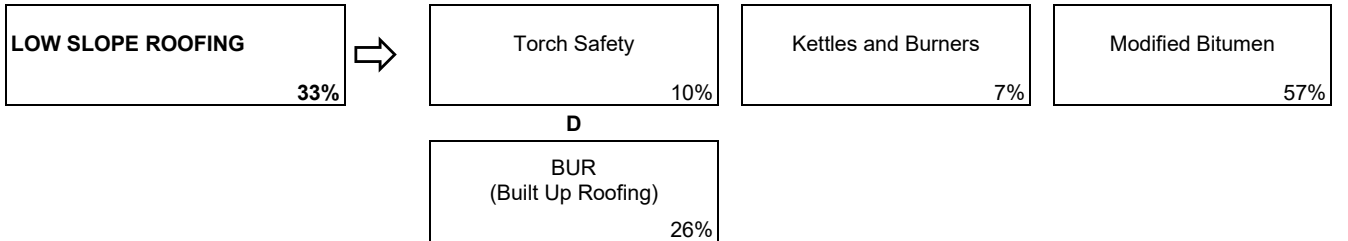


**Rofer Training Profile  
FIRST PERIOD  
(6 Weeks 30 Hours Per Week – Total of 180 Hours)**

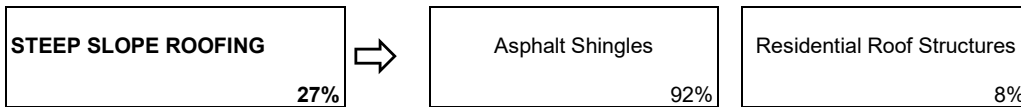
**SECTION ONE**



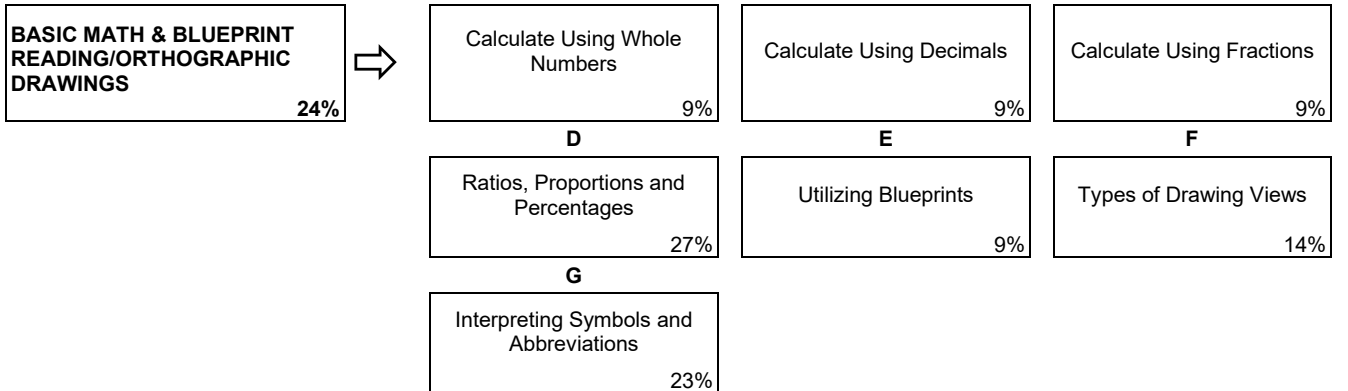
**SECTION TWO**



**SECTION THREE**



**SECTION FOUR**



**SECOND PERIOD**  
**(6 Weeks 30 Hours Per Week – Total of 180 Hours)**

**SECTION ONE**

**LOW SLOPE ROOFING/ROOF FAILURE/RE-ROOFING**  
 38%



**A**

Single Ply Tools and Equipment  
 3%

**B**

Single Ply Materials and Installation (Thermoset)  
 38%

**C**

Single Ply Materials and Installation (Thermoplastic)  
 38%

**D**

Causes of Roof Failures  
 6%

**E**

Leak Detection  
 3%

**F**

Preventative Roof Maintenance  
 6%

**G**

Re-Roofing  
 6%

**SECTION TWO**

**STEEP SLOPE ROOFING**  
 37%



**A**

Softwood Shingles  
 48%

**B**

Softwood Shakes  
 52%

**SECTION THREE**

**INTERMEDIATE TRADE MATH & BLUEPRINTS**  
 25%



**A**

Pythagorean Theory and Square Roots  
 13%

**B**

Perimeters and Areas  
 22%

**C**

Roof Slope Calculations  
 22%

**D**

Blueprint Interpretation  
 13%

**E**

Construction Details  
 30%



**THIRD PERIOD**  
**(6 Weeks 30 Hours Per Week – Total of 180 Hours)**

**SECTION ONE**

<b>STEEP SLOPE ROOFING</b> 29%	⇒	<b>A</b>	<b>B</b>	<b>C</b>
		Concrete Tile 19%	Metal Tile 19%	Metal Roofing 62%

**SECTION TWO**

<b>METAL FLASHING</b> 23%	⇒	<b>A</b>	<b>B</b>	
		Sheet Metal Flashing 57%	Flanged Accessories 43%	

**SECTION THREE**

<b>ALTERNATE SYSTEMS, TRADE SCIENCE &amp; EQUIPMENT MAINTENANCE</b> 20%	⇒	<b>A</b>	<b>B</b>	<b>C</b>
		Waterproofing and Damp-proofing 11%	Sustainable Roofing 6%	Vapour Barriers 5%
		<b>D</b>	<b>E</b>	<b>F</b>
		Insulation 11%	Ventilation 6%	Roof Drainage 6%
		<b>G</b>	<b>H</b>	
		Motorized Roofing Equipment 33%	Hoisting Equipment 22%	

**SECTION FOUR**

<b>MATERIAL CALCULATIONS &amp; ROOFING STANDARDS</b> 28%	⇒	<b>A</b>	<b>B</b>	<b>C</b>
		Steep Slope Material Calculations 36%	Low Slope Material Calculations 36%	Roofing Operations and Structure 4%
		<b>D</b>	<b>E</b>	<b>F</b>
		Workplace Coaching Skills 12%	Trade Associations 4%	Interprovincial Standards (Red Seal) 8%

**FIRST PERIOD TECHNICAL TRAINING  
ROOFER TRADE  
CURRICULUM GUIDE**

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

**SECTION ONE:..... STANDARD WORKPLACE SAFETY ..... 16%**

**A. Safety Legislation, Regulations & Industry Policy in the Trades ..... 7%**

**Outcome:**     ***Apply legislation, regulations and practices ensuring safe work in this trade.***

1.     Demonstrate the application of the Occupational Health and Safety Act, Regulation and Code.
2.     Describe the sponsor's and employee's role with Occupational Health and Safety (OH&S) regulations, Worksite Hazardous Materials Information Systems (WHMIS), fire regulations, Workers Compensation Board regulations and related advisory bodies and agencies.
3.     Describe industry practices for hazard assessment and control procedures.
4.     Describe the responsibilities of workers and sponsors to apply emergency procedures.
5.     Describe tradesperson attitudes with respect to housekeeping, personal protective equipment and emergency procedures.
6.     Describe the roles and responsibilities of sponsors and employees with the selection and use of personal protective equipment (PPE).
7.     Maintain required PPE for tasks.
8.     Use required PPE for tasks.

**B. Climbing, Lifting, Rigging and Hoisting ..... 7%**

**Outcome:**     ***Use industry standard practices for climbing, lifting, rigging and hoisting in this trade.***

1.     Describe manual lifting procedures.
2.     Describe rigging hardware and associated safety factors.
3.     Select equipment for rigging loads.
4.     Describe hoisting and load moving procedures.
5.     Maintain personal protective equipment (PPE) for climbing, lifting and load moving equipment.
6.     Use PPE for climbing, lifting and load moving equipment.

**C. Hazardous Materials & Fire Protection..... 11%**

**Outcome:**     ***Apply industry standard practices for hazardous materials and fire protection in this trade***

1.     Describe roles, responsibilities, features and practices related to the Workplace Hazardous Materials Information System (WHMIS) program.
2.     Describe three key elements of WHMIS.
3.     Describe handling, storing and transporting procedures for hazardous material.
4.     Describe venting procedures when working with hazardous materials.
5.     Describe hazards, classes, procedures and equipment related to fire protection.

**D. Safe Roofing Practices and Regulations ..... 11%**

**Outcome:** *Apply trade related Occupational Health and Safety regulations and safe work practices in the workplace.*

1. Describe the procedures for obtaining first aid training.
2. Identify Occupational Health and Safety regulations most pertinent to the roofing industry.
3. Discuss fall protection as related to the roofing industry.
4. Describe the potential injuries that could result from roofing work site hazards, such as:
  - a) strains and sprains
  - b) lacerations
  - c) heat exhaustion
  - d) sun stroke
  - e) frost bite
  - f) burns.
5. Discuss safe work practices related to roofing construction sites and public safety.

**E. Commercial / Industrial Roof Structures ..... 18%**

**Outcome:** *Describe commercial and industrial type roof structures.*

1. Define construction features found on commercial and industrial buildings in relation to terminology.
2. Identify various types of roof styles and shapes in low slope designs.

**F. Roof Deck Materials ..... 7%**

**Outcome:** *Identify the types of materials used for roof decks.*

1. Describe the types of roof deck materials, such as:
  - a) wood
  - b) concrete
  - c) steel
  - d) stramit.

**G. Roof Deck Loading Procedures ..... 7%**

**Outcome:** *Describe the various preparation and loading techniques used for roof decks.*

1. Identify procedures used to conduct a visual deck assessment prior to a new roof application for:
  - a) wood decks
  - b) steel decks
  - c) concrete decks.
2. Describe deck preparation techniques prior to a roof replacement application for:
  - a) wood decks
  - b) steel decks
  - c) concrete decks
  - d) structural stramit.
3. Explain the procedures for loading materials and equipment onto a roof deck.
4. Identify the strong and weak areas of a roof deck in relation to roof loading.
5. Demonstrate the securing and protection of materials loaded onto a roof deck.

**H. Hand and Power Tools ..... 7%****Outcome: Demonstrate the ability to use and maintain roofing hand and power tools.**

1. Demonstrate the ability to select and use various roofing hand tools for specific jobs.
2. Demonstrate the maintenance and storage of various roofing hand tools.
3. Demonstrate the ability to select and use various roofing power tools for specific jobs.
4. Demonstrate the maintenance and storage of various roofing power tools.

**I. Hoisting Equipment for Roofing ..... 11%****Outcome: Identify and demonstrate the use of hoisting equipment pertinent to the roofing industry.**

1. Define the regulations required for hoisting and hoisting equipment as dictated by Alberta Workplace Health and Safety.
2. Describe the various types of hoisting equipment used in roofing.
3. Demonstrate hand signals used for hoisting.
4. Demonstrate proficiency in the assembly and disassembly of roof hoists.
5. Demonstrate the ability to work with ropes (knots and splices).

**J. Roofing Equipment..... 7%****Outcome: Outline the use and maintenance of on-deck roofing equipment.**

1. Identify the types of on-deck roofing equipment and the safety requirements of each.
2. Describe the procedures used to operate various types of on-deck roofing equipment.
3. Explain the maintenance and storage of on-deck roofing equipment.

**K. Truck Loading Procedures ..... 7%****Outcome: List the procedures for loading materials and equipment onto a truck.**

1. Describe the sequence and distribution for loading materials onto a truck.
2. Define the process for securing materials onto a truck.
3. Describe the sequence and weight distribution for loading equipment onto a truck.
4. Define the process for securing equipment onto a truck.

**SECTION TWO: .....LOW SLOPE ROOFING ..... 33%****A. Torch Safety ..... 10%****Outcome: Identify and demonstrate torch safety standards and practices as they pertain to the roofing industry.**

1. Perform roof top site hazard assessments.
2. Describe "Torch Safety" practices including "Fire Risk Management".
3. Demonstrate the set-up and operation of LP gas torches.
4. Perform fire watch techniques and recording.

**B. Kettles and Burners..... 7%****Outcome:      *Demonstrate the start up, use and shut down of asphalt melting equipment.***

1. Describe the use of asphalt melting equipment and asphalt pumps.
2. Demonstrate the process used for the start-up of kettle operations.
3. List the procedures for handling and using “hot” products.
4. Demonstrate the process used to shutdown asphalt melting equipment.

**C. Modified Bitumen..... 57%****Outcome:      *List and demonstrate the installation of various modified bitumen roof systems.***

1. List the various components of modified bitumen systems, such as:
  - a) asphalts and adhesives
  - b) vapour barriers
  - c) insulations and cover boards
  - d) base sheets
  - e) cap sheets
  - f) cold-process applications.
2. Demonstrate the installation techniques for various modified bitumen systems.
3. Discuss new materials as they become available.

**D. BUR (Built Up Roofing) ..... 26%****Outcome:      *Explain the installation of various BUR roof systems.***

1. Discuss the prevention of asphalt burns.
2. List the various components of BUR systems, such as:
  - a) asphalts and adhesives
  - b) vapour barriers
  - c) insulations and cover boards
  - d) organic and glass felts
  - e) cold-process applications
3. Describe application methods for the installation of BUR roof systems.
4. Describe various membrane flashings for BUR systems.
5. Explain membrane protection requirements.
6. Discuss new materials as they become available.

**SECTION THREE ..... STEEP SLOPE ROOFING ..... 27%****A. Asphalt Shingles..... 92%****Outcome:      *Describe the types of asphalt shingles and installation techniques.***

1. Describe various components of an asphalt shingle system, such as:
  - a) eave and valley components
  - b) underlayment
  - c) flashings.

2. Describe the equipment used in the application of asphalt shingles.
3. Demonstrate the application process for asphalt shingles.
4. Discuss new materials as they become available.

**B. Residential Roof Structures ..... 8%**

**Outcome:** *Describe residential type roof structures.*

1. Describe construction features found on residential buildings in relation to terminology.
2. Identify various types of roof styles and shapes in steep slope designs.

**SECTION FOUR ....BASIC MATH & BLUEPRINT READING/ORTHOGRAPHIC DRAWINGS..... 24%**

**A. Calculate Using Whole Numbers ..... 9%**

**Outcome:** *Solve mathematical problems using basic arithmetic.*

1. Perform calculations using whole numbers.
2. Perform calculations using the metric system.
3. Perform calculations using the imperial system.

**B. Calculate Using Decimals ..... 9%**

**Outcome:** *Solve mathematical problems using decimal numbers.*

1. Perform calculations using decimals.

**C. Calculate Using Fractions ..... 9%**

**Outcome:** *Solve mathematical problems using fractions.*

1. Perform calculations using fractions.

**D. Ratios, Proportions and Percentages ..... 27%**

**Outcome:** *Solve mathematical problems using ratios, proportions and percentages.*

1. Perform calculations using percentages.
2. Perform calculations using ratios and proportions.

**E. Utilizing Blueprints ..... 9%**

**Outcome:** *Understand the role of blueprints in the construction industry.*

1. List the basic components of a set of working drawings.
2. Explain the relationship between blueprints and specifications.

**F. Types of Drawing Views ..... 14%**

**Outcome:** *Draw and interpret various drawing styles.*

1. Draw and interpret orthographic drawings.
2. Identify the various types of lines used in blueprints.

**G. Interpret Symbols and Abbreviations..... 23%**

**Outcome:**     *Identify the symbols and abbreviations used in blueprints.*

1.     Identify symbols on a set of blueprints.
2.     Decipher abbreviations on a set of blueprints.

**SECOND PERIOD TECHNICAL TRAINING  
ROOFER TRADE  
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**SECTION ONE:..... LOW SLOPE/ROOF FAILURES/RE-ROOFING ..... 38%**

**A. Single Ply Tools and Equipment..... 3%**

**Outcome:** *Identify roofing tools and equipment used for single ply applications.*

1. Identify the various tools and equipment used in low slope single ply roofing.
2. Describe the purpose and operation of various single ply tools and equipment.
3. Describe the maintenance and storage of single ply tools and equipment.

**B. Single Ply Materials and Installation (Thermoset) ..... 38%**

**Outcome:** *Identify the materials and demonstrate the installation processes for thermoset single ply roof systems.*

1. Describe and demonstrate the installation process of thermoset membranes.
  - a) EPDM
2. Discuss new materials as they become available.

**C. Single Ply Materials and Installation (Thermoplastic) ..... 38%**

**Outcome:** *Identify the materials and demonstrate the installation processes for thermoplastic single ply roof systems.*

1. Describe and demonstrate the installation process of thermoplastic membranes.
  - a) PVC
  - b) TPO
2. Discuss new materials as they become available.

**D. Causes of Roof Failures ..... 6%**

**Outcome:** *Describe the causes and effects of roof failures and the repair techniques used.*

1. Discuss examples of roof failures.
2. Explain various roof defects and deficiencies.
3. Describe methods used to repair roof defects and deficiencies.

**E. Leak Detection ..... 3%**

**Outcome:** *Identify detection processes and probable causes of roof leaks.*

1. Describe the process used to identify the source of a roof leak.
2. Explain condensation leaks.
3. Discuss potential sources of water ingress.



**F. Preventative Roof Maintenance ..... 6%**

**Outcome:** *Explain the importance of regular roof maintenance to address normal wear.*

1. Discuss various environmental conditions and their adverse affect on roofs.
2. Discuss the importance of preventative roof maintenance.
3. Discuss the elements of a roof evaluation.

**G. Re-roofing..... 6%**

**Outcome:** *Explain the steps taken to perform a re-roof.*

1. Describe the demolition process to re-roof a building.
2. Describe the methods used to seal and maintain the integrity of a roof during re-roofing.
3. Describe the techniques used to cover open areas of roofs during sudden weather shifts.
4. Explain the potential safety issues specific to re-roofing projects.

**SECTION TWO ..... STEEP SLOPE ROOFING ..... 37%**

**A. Softwood Shingles ..... 48%**

**Outcome:** *Describe the types of softwood shingles and installation techniques.*

1. Identify the types and grades of softwood shingles.
2. Demonstrate the process used to remove existing roofing.
3. Describe installation techniques including underlayment and flashing requirements.
4. Demonstrate the method used to apply softwood shingles on steep roofs.

**B. Softwood Shakes..... 52%**

**Outcome:** *Describe the types of softwood shakes and installation techniques.*

1. Identify the types and grades of softwood shakes.
2. Demonstrate the process used to remove existing roofing.
3. Describe installation techniques including underlayment and flashing requirements.
4. Demonstrate the method used to apply softwood shakes on steep roofs.
5. Discuss alternate products such as composite materials.

**SECTION THREE ..... INTERMEDIATE TRADE MATH & BLUEPRINTS..... 25%**

**A. Pythagorean Theory and Square Roots ..... 13%**

**Outcome:** *Calculate trade related problems using the Pythagorean theory and square roots.*

1. Solve geometrical problems using the Pythagorean theory.
2. Solve geometrical problems using the square root formula.

**B. Perimeters and Areas..... 22%**

**Outcome:**     **Calculate trade related problems using perimeter and area for geometrical trade related problems.**

1.     Perform calculations using perimeter formulas on geometric shapes.
2.     Perform calculations using area formulas on geometric shapes.

**C. Roof Slope Calculations ..... 22%**

**Outcome:**     **Calculate trade related problems for various roof slopes.**

1.     Perform calculations to determine the roof slope of steep slope roofs.
2.     Perform calculations to determine the roof slope of low slope roofs.

**D. Blueprint Interpretation ..... 13%**

**Outcome:**     **Demonstrate the ability to collect roofing related information from blueprints.**

1.     Demonstrate the ability to gather roofing information from working blueprints.
2.     Demonstrate the ability to read and interpret specifications.

**E. Construction Details..... 30%**

**Outcome:**     **Demonstrate the ability to scale and draw various roofing details.**

1.     Read scale rulers using imperial and metric dimensions.
2.     Demonstrate the ability to scale drawings and details.
3.     Demonstrate the ability to draft roofing details.

**THIRD PERIOD TECHNICAL TRAINING  
ROOFER TRADE  
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**SECTION ONE:.....STEEP SLOPE ROOFING ..... 29%**

**A. Concrete Tile ..... 19%**

**Outcome:** *Outline the types of concrete tile and the application procedures.*

1. List the types of concrete tile.
2. Describe the application techniques and requirements for concrete tile.
3. Describe the tools and equipment used for installation.

**B. Metal Tile ..... 19%**

**Outcome:** *Outline the types of metal tile and the application procedures.*

1. List the types of metal tile.
2. Describe the application techniques and requirements for metal tile.
3. Describe the tools and equipment used for installation.

**C. Metal Roofing ..... 62%**

**Outcome:** *Describe the types of metal roofing and demonstrate the installation techniques.*

1. List the types of metal roofs.
2. Explain the application techniques and requirements for metal roofs.
3. Identify the use of tools and equipment for installation.
4. Demonstrate application techniques for various metal roof systems.

**SECTION TWO:..... METAL FLASHING..... 23%**

**A. Sheet Metal Flashing ..... 57%**

**Outcome:** *Demonstrate the ability to fabricate and install metal flashings.*

1. Describe and operate metal flashing fabrication equipment.
2. Demonstrate the ability to layout and fabricate metal flashings.
3. Demonstrate the ability to install metal flashings.

**B. Flanged Accessories..... 43%**

**Outcome:** *Demonstrate the fabrication of different types of flanged accessories.*

1. List the various types of metals used for flanged accessories.
2. Demonstrate the ability to layout and fabricate flanged accessories.

**SECTION THREE: ..... ALTERNATE SYSTEMS, TRADE SCIENCE ..... 20%  
& EQUIPMENT MAINTENANCE**

**A. Waterproofing and Damp-proofing ..... 11%**

**Outcome:** *Describe the materials and methods used in waterproofing and damp-proofing.*

1. Define waterproofing and damp-proofing.
2. Discuss the types of materials used in waterproofing.
3. Discuss the types of materials used in damp-proofing.
4. Describe the application methods used in waterproofing and damp-proofing.
5. Outline the special safety requirements for working “below grade” or in a “confined space”.

**B. Sustainable Roofing ..... 6%**

**Outcome:** *Identify the types of materials and methods used for sustainable roofing.*

1. Explain the construction of garden roof systems including the advantages and disadvantages.
2. Describe the components (layers and sequence) and the special structural requirements of a garden roof system.
3. Discuss the various rooftop photovoltaic systems.
4. Discuss roofing and the urban heat island effect including bright membranes, solar reflectivity and emissivity.

**C. Vapour Barriers ..... 5%**

**Outcome:** *Identify the different types and functions of air and vapour barriers.*

1. Discuss the importance of a vapour barrier.
2. Describe the differences between a vapour retarder, vapour barrier and an air barrier.
3. Discuss the types of vapour retarder, vapour barrier and air barrier materials.
4. Discuss compatibility and continuity with the various building envelope systems.

**D. Insulation ..... 11%**

**Outcome:** *Identify the different types and functions of roof insulations.*

1. Describe the chemical classifications of roof insulations.
2. Describe the advantages and disadvantages of various types of insulation.
3. Identify the “R” value of various insulations.
4. Describe the application methods for the installation of roof insulations.

**E. Ventilation ..... 6%**

**Outcome:** *Identify the different types and functions of ventilation systems.*

1. Describe the importance of ventilation for roof systems.
2. Describe the different types of ventilation systems.
3. Determine the correct amount of ventilation required for various roof systems.
4. Explain the differences in venting for low slope and steep slope roofs.

**F. Roof Drainage ..... 6%**

**Outcome:** *Identify the various types and functions of roof drainage systems.*

1. Explain the differences between interior and exterior drainage systems.
2. Describe the types of roof drainage systems.

**G. Motorized Roofing Equipment ..... 33%**

**Outcome:** *Describe and perform maintenance tasks for motorized roofing equipment.*

1. Perform required safety inspections.
2. Discuss routine on-deck maintenance
3. Describe troubleshooting methods used.
4. Demonstrate maintenance techniques used.
5. Describe and demonstrate techniques used to troubleshoot and maintain small engines.

**H. Hoisting Equipment..... 22%**

**Outcome:** *Describe and perform maintenance tasks for hoisting equipment.*

1. Perform the required safety inspections.
2. Discuss routine on-deck maintenance.
3. Describe troubleshooting methods used.
4. Demonstrate maintenance techniques used.

**SECTION FOUR: .....MATERIAL CALCULATIONS & ROOFING STANDARDS..... 28%**

**A. Steep Slope Material Calculations ..... 36%**

**Outcome:** *Calculate materials for various steep slope roof styles.*

1. Determine the types of materials required for steep slope roofs.
2. Calculate material amounts on steep slope roofs.
3. Calculate flashing amounts on steep slope roofs.

**B. Low Slope Material Calculations..... 36%**

**Outcome:** *Calculate materials for various low slope roof styles.*

1. Determine the types of materials required for low slope roofs.
2. Calculate material amounts on low slope roofs.
3. Calculate flashing amounts on low slope roofs.

**C. Roofing Operations and Structure..... 4%**

**Outcome:** *Understand the responsibilities of various members of a roofing crew.*

1. Describe the various members of a roofing crew; both direct and indirect.
2. Discuss effective and efficient use of materials and labour for a roofing crew.

**A. Workplace Coaching Skills..... 12%**

**Outcome: Use coaching skills when training an apprentice.**

1. Describe the process for coaching an apprentice.

**B. Trade Associations..... 4%**

**Outcome: Describe the minimum standards set by Roofer trade associations.**

1. Identify the need for minimum roofing standards as required by the Alberta Roofing Contractors Association (ARCA) and the Alberta Allied Roofing Association (AARA).
2. Outline the conditions of guarantee offered by the Alberta Roofing Contractors Association (ARCA) and the Canadian Roofing Contractors Association (CRCA).
3. Discuss the roles and responsibilities of roof consultants.

**C. Interprovincial Standards Red Seal Program ..... 8%**

**Outcome: Use Red Seal products to challenge an Interprovincial examination.**

1. Identify Red Seal products used to develop Interprovincial examinations.
2. Identify Red Seal products to prepare for an Interprovincial examination.



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