CAR-0100 Wood and Wood Products

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 1 and the National Carpenter Commonplace Curriculum unit A.1.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify different types of woods, identify lumber and lumber products and describes wood products used in the construction process.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of wood and wood products, their characteristics, production and use in the trade

Required Knowledge and Skills:

1. Identify the different types of wood.
    - tree structure
    - species/classification (hardwood, softwood)
    - wood commonly used

2. Identify the characteristics of lumber and wood products.
    - sapwood
    - heartwood
    - springwood
    - summerwood
    - annual rings
    - pith
    - rays

- grain
- knots
- pitch pocket
- wane
- warp
- twist or Wind
- bow
- cup
- crook
- split
- check
- shake
- cross grain
- density
- moisture content

3. Describe lumber production.
   - treating (pressure, creosote, etc.)
   - planing
   - sawing (boards/lumber/timber)
   - drying
   - grading

4. Describe panel products **and describe their uses**.
   - veneers
   - laminations
   - grading
   - interior/exterior glues
   - particle boards
   - plywood
   - chipboards
   - strand boards
   - fibre board

5. Describe manufactured structural elements **and describe their applications and use**.
   - parallel strand lumber (PSL)
   - glulam (lumber products)
   - laminated veneer lumber (LVL)
   - finger jointing
   - hot glueing
   - cold glueing
   - laminated strand lumber (LSL)

6. Identify wood product components **and describe their applications and use**.
   - trusses

- rafters
- joists
- studs
- sheathings
- millwork
- laminated beams, etc.
- engineered/manufactured joists
- shingles
- siding
- flooring
- stairs

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-0105 Non-wood Products

Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 1 and the National Carpenter Commonplace Curriculum unit A.1.2.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify the different metal, plastic and composite products used in the construction process.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of non-wood building materials and products, their characteristics, production and use in the trade.

Required Knowledge and Skills:

1. Identify the different types of metal products used in the industry **and describe their applications**.
   - structural elements
   - reinforcement
   - connectors
   - cladding
   - fasteners
   - doors/windows
   - flashing
   - meshes/Laths
   - anchor bolts
   - hardware
   - grates

2. Identify the different plastic products used in the industry **and describe their**

applications.

- siding
- millwork
- eaves trough
- doors/windows
- trims
- modular structural component
- flooring
- roofing
- solid surfaces/solid plastics/solid surfacing material
- recycled plastics

3. Identify the different composite products used in the industry **and describe their applications**.
   - gypsum based products
   - tile
   - asphalt impregnated fibreboard
   - plastic laminates
   - fibre cement products
   - asphalt products

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-0110 Concrete and Concrete Products

Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 1 and the National Carpenter Commonplace Curriculum unit A.1.3.

Description:

The course is designed to provide apprentices with the knowledge and skills required to identify concrete products and their use in the construction process.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of concrete as a building material

Required Knowledge and Skills:

1. Identify cast-in-place concrete products **and describe their use**.
   - footings, grade beams, piles and pile caps
   - walls
   - slab-on-grade
   - pavers
   - beams and girders
   - suspended slabs

2. Describe precast components **and their use**.
   - walls
   - beams and joists
   - piles
   - core floor/hollow core
   - traffic barriers
   - lift slabs
   - utility vaults

- septic tanks
- stairs

3. Describe the procedures for installing precast components (structural members).
   - lifting methods
   - pick-up points
   - anchoring
   - grouting
   - caulking

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1115 Concrete (Place, Finish & Cure)

Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 4, 5 & 6 and the National Carpenter Commonplace Curriculum units A.1.4 & A.1.5.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the testing, placement, consolidation, finishing, and curing of concrete.

Prerequisites:

CAR-1110

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the testing, placement, consolidation, finishing, and curing of concrete

Required Knowledge and Skills:

1. Describe the mixing of concrete.
   - concrete strengths
   - cements
   - aggregates
   - water cement ratio
   - fibre reinforcement
   - light weight concrete
   - hardeners
   - admixtures
   - batch plant mixing
   - on site mixing

2. Describe the testing of concrete.
   - slump

- air entrainment
- compression

3. Describe concrete placement.
   - rate of placement
   - sequence
   - maximum drop
   - tremmies (Elephant Trunks)
   - drop chutes
   - consolidation

4. Describe concrete finishing.
   - screeding
   - strike off
   - float
   - trowel
   - edge
   - joint
   - architectural finishes
   - finish elevation

5. Describe the procedures for curing concrete.
   - cold weather curing
   - hot weather curing
   - ponding
   - soaking
   - curing agents
   - hardeners
   - impact of early stripping
   - impact of late stripping

6. Describe the characteristics of concrete.
   - wear resistance
   - durability
   - permeability

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Mix concrete.
   - water
   - cement
   - fine and coarse aggregate

2. Perform slump/strength compressive test.
   - slump cone procedures
   - compressive test

3. Place concrete.
   - delivery
   - vibrate
   - finishing
   - curing

CAR-0120 Fasteners/Adhesives/Sealants/Fillers

Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 1 and the National Carpenter Commonplace Curriculum unit A.1.6.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify fasteners, adhesives, sealants, fillers and mechanical connectors used in the construction process and their uses.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

– **demonstrate knowledge of fasteners, adhesives, sealants, fillers and connectors, and their use in the trade**

Required Knowledge and Skills:

1. Identify mechanical fasteners **describe their applications and procedures for use**.
   - nails
   - screws
   - bolts
   - staples
   - gang nails
   - anchors

2. Identify adhesives used in industry **and describe their applications and procedures for use**.
   - contact cements
   - resins
   - glues
   - spray adhesives

- solvent adhesives
- solders
- hot adhesives
- water based adhesives
- epoxy

3. Identify sealants used in industry **and describe their applications and procedures for use**.
   - tape
   - acoustical sealants
   - putty
   - glazing compound
   - caulking compounds
   - expanding foam

4. Identify fillers used in industry **and describe their applications and procedures for use.**
   - joint compound
   - wood filler
   - backer rods
   - plastic wood

5. Identify connectors used in industry **and describe their applications and procedures for use.**
   - split rings
   - timber connectors
   - framing anchors
   - joist hangers
   - fish plates
   - hurricane clips
   - "H" clips
   - "T" plates
   - shear plates

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-0125 Building Envelope

Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 1 and the National Carpenter Commonplace Curriculum unit A.1.7.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify air and moisture control products and building insulation products and describe their use and installation.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
- demonstrate knowledge of air and moisture control products, their use and installation
- demonstrate knowledge of building insulation products, their use and installation

Required Knowledge and Skills:

1. Identify air/moisture control products **and describe their applications and procedures for use.**
   - vapour barriers
   - moisture barriers
   - air barriers
   - building papers

2. Identify insulation materials **and describe their applications and procedures for use.**
   - batt insulation
   - rigid insulation
   - loose insulation
   - foamed in-place
   - air gap
   - foil insulation

3. Describe the installation of air/moisture control products **and describe their applications and procedures for use.**
   - vapour barriers
   - moisture barriers
   - air barriers
   - building papers

4. Describe the installation of insulation products **and describe their applications and procedures for use.**
   - batt insulation
   - rigid insulation
   - loose insulation
   - foamed in-place
   - foil insulation

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1130 Tools & Equipment

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 1 and the National Carpenter Commonplace Curriculum unit A.2.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify, use and maintain hand and power tools and material handling equipment.

Prerequisites:

CAR-0100, 0105, 1110, 0135

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the tools and equipment used in the trade, their correct use and care

Required Knowledge and Skills:

HAND TOOLS

1. Identify hand tools.
   - hand saws
   - adjustable wrench
   - back saw
   - plane
   - brace & set of bits
   - carpenter's apron
   - caulking gun
   - chalk line
   - combination square
   - dry line
   - file
   - framing square

- hack saw
- hammer
- hand level
- jitter-bug
- comealong
- roller bug
- rake
- shovel
- trowel
- bull float
- darby
- hand float
- edgers
- jointers
- hatchet
- measuring tape
- screwdrivers
- nail puller
- pencil/marking instrument
- pliers & side cutter
- plumb bob
- stapler
- utility knife
- wrecking bar
- angle divider
- brad driver
- builder's level
- butt gauge marker
- clamps
- coping saw
- drill bits
- nail sets
- sharpening stones
- rasp
- scriber
- chisels
- sliding t-bevel
- stair gauge

2. Describe various types of hammering tools, their characteristics and applications, care and maintenance.

- **claw hammer**
- **maul**
- **axe**
- **mallet**

3. **Describe cutting tools, their characteristics, applications, safe use, care and maintenance.**
   - **crosscut saws**
   - **rip saws**
   - **specialty saws**

4. **Describe planing tools, their characteristics and applications, correct use, care and maintenance.**
   - **jack**
   - **block**
   - **smooth**
   - **specialty planes**
   - **chisels**

5. **Describe standard measuring tools, their characteristics and applications, correct use, care and maintenance.**
   - **imperial tape**
   - **metric tape**
   - **steel tape**

6. **Describe standard layout tools, their characteristics and applications, correct use, care and maintenance.**
   - **framing square**
   - **speed square**
   - **combination square**
   - **straight edge**
   - **gauges**
   - **trammels**

7. **Describe testing tools, their function and applications, correct use, care and maintenance.**
   - **two foot level**
   - **spirt level**
   - **line level**
   - **plumb bob**
   - **straight edges**

8. **Describe drilling tools, their function and applications, correct use, care and maintenance.**
   - **ratchet brace**
   - **push drills**
   - **breast drills**
   - **bits and accessories**

9. **Describe smoothing tools, their function and applications, correct use, care and**

maintenance.

- **scrapers**
- **files**
- **rasps**
- **abrasives**

10. Describe clamping tools, their function and applications, correct use, care and maintenance.

- **hand clamps**
- **bar clamps**
- **hand wood screw clamps**
- **quick release clamps**
- **spring clamps**
- **banding clamps**

PORTABLE POWER TOOLS

11. Identify powered tools.
    - chainsaw
    - circular saw
    - compressor
    - screw gun
    - electric drill
    - generator
    - jig saw
    - laminate trimmer
    - mitre saw
    - planer
    - portable power tool accessories
    - powder actuated tools
    - power nailer/fastener
    - reciprocating saw
    - routers
    - sanders
    - screwdriver
    - stapler
    - post hole auger
    - power trowels
    - concrete pumps

12. Describe portable power saws, their function, applications, and correct procedure for their safe use.

- **circular saws**
- **saber saws**
- **reciprocating saws**
- **cut off saws**
- **small table saws**

13. Describe the characteristics, applications and care of saw blades and accessories.

14. Describe power drills, their function and applications, safe use and care.

- **variable speed**
- **cordless**
- **screw guns**
- **hammer drills**

15. Describe the characteristics, applications and use of drill bits and accessories.

16. Describe power planes, their function and applications correct procedures for safe use and care.

17. Describe power sanders, their function and applications, correct procedures for safe use and care.
- **orbital sanders**
- **oscillating**
- **finishing sanders**
- **belt sanders**
- **sanding paper**

18. Describe portable routers and their components, their function and applications, correct procedures for safe use, care and maintenance.
- **small routers**
- **large routers**
- **laminate trimmers**
- **plunge routers**
- **table routers**
- **bits and accessories**

STATIONARY POWER TOOLS

19. Identify common stationary powered tools.
- band saw
- compressor
- disk/belt sander
- drill press
- grinder
- jointer
- metal cutoff saw
- radial arm saw
- table saw
- thickness planer
- shaper

20. Describe table saws and accessories, their function and applications, correct procedures for safe use, care and maintenance.
- **sizes**

- **blades**
- **mitre gauges**
- **fences**
- **feather boards**
- **motors**
- **safety accessories**

21. **Describe band saws and accessories, their function and applications, correct procedures for maintenance and safe use.**
    - **sizes**
    - **blades**
    - **mitre gauges**
    - **fences**
    - **feather boards**
    - **motors**
    - **safety accessories**

22. **Describe radial-arm saws and accessories, their function and applications, correct procedures for safe use, care and maintenance.**
    - **sizes**
    - **blades**
    - **mitre gauges**
    - **fences**
    - **motors**
    - **safety accessories**

23. **Describe stationary jointers and accessories, their function and applications, correct procedures for safe use and care.**
    - **sizes**
    - **fences**
    - **adjustments**
    - **safety accessories**

24. **Describe drill presses and accessories, their characteristics, function, applications, and correct procedures for the safe use.**
    - **sizes**
    - **speeds**
    - **bits**
    - **tables**
    - **motors**
    - **adjustments**
    - **safety accessories**

25. **Describe stationary thickness planers, their characteristics, function and applications.**

- **sizes**
- **adjustments**

26. Describe dust collecting systems.

POWDER ACTUATED TOOLS

27. Describe the various powder actuated tools and their characteristics.
- **high/low velocity**
- **power loads**
- **fasteners**
- **base material**
- **safety accessories**

28. Describe the applications of the various powder actuated tools, accessories and fasteners.

29. Describe the safe and proper use of powder actuated tools.

30. Describe the correct care and maintenance of powder actuated tools.

PNEUMATIC TOOLS

31. Identify pneumatic tools and equipment and describe their applications.
- **spikers**
- **brad nailers**
- **impulse nailer**
- **roof nailers**
- **floor nailers**
- **compressors**
- **hoses**
- **fittings**
- **air chucks**

32. Describe types of fasteners and accessories used with pneumatic equipment.

33. Describe the procedures for safe and correct use of pneumatic tools.

34. Describe the correct care and maintenance of pneumatic tools.

MATERIAL HANDLING EQUIPMENT

35. Identify material handling equipment **and describe their applications and procedures for use.**
- boom truck
- forklift
- scissor jack
- skid steer loader

- crane/hoisting equipment
- rigging accessories
- concrete pump

SPECIALTY ROOFING TOOLS

36. Identify specialty roofing tools **and describe their applications and procedures for use.**
    - power tools
    - shingling hatchet
    - air nailer
    - portable masonry saw
    - roofer's knife
    - power ladder
    - roofing shovel
    - metal nibbler (power shear)

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Use hand tools.
    - maintenance
    - operation
    - inspection

2. Use and maintain hammering tools

3. Use and maintain cutting tools for:
    - **crosscutting**
    - **ripping**
    - **cutting material to size**

4. Use and maintain planing tools to:
    - **smooth material**
    - **make wood joints**

5. Use and maintain standard measuring tools to:
    - **measure sizes**
    - **measure distances**

6. Use and maintain standard layout tools to layout projects.
    - **wood joints**
    - **saw horse**

7. **Use and maintain testing tools for:**
   - **levelling**
   - **transferring lines**
   - **setting grades**

8. **Use and maintain drilling tools for precision drilling**

9. **Use and maintain smoothing tools to:**
   - **shape material**
   - **sand material**

10. **Use various clamps for gluing.**

11. Use powered tools.
   - maintenance
   - operation
   - inspection

12. **Use and maintain portable power saws to:**
   - **cross cut**
   - **rip cut**
   - **plunge cut**
   - **scroll**

13. **Use and maintain power drills for:**
   - **precision drilling**
   - **counter sinking**
   - **counter boring**

14. **Use and maintain power planes.**
   - **smoothing**
   - **straightening**
   - **sharpening**

15. **Use and maintain power sanders for:**
   - **smoothing material**
   - **truing material**

16. **Use and maintain portable routers for:**
   - **outside edge routing**
   - **inside edge routing**
   - **plunging routing**

17. Use stationary powered tools.
    - maintenance
    - operation
    - inspection

18. Use rigging accessories.
    - Maintenance
    - Operation
    - Inspection

19. Make wood joints.

20. Build a saw horse.

CAR-0135 Construction Safety

Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 1 to 17 and the National Carpenter Commonplace Curriculum Unit A.3.1.

Description:

This course is designed to provide apprentices with the information necessary to work safely in the workshop and on the building site, and to comply with relevant regulations and statutes.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of safety regulations applied to industry, to the trade, to employers and employees
- demonstrate knowledge of hazards, safe work practices and good housekeeping on the job site and in the workshop environment
- demonstrate knowledge of personal protective safety equipment and fall arrest systems, and their correct care and use

Required Knowledge and Skills:

PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

1. Identify PPE/PPC.
   - hearing
   - eye
   - respiratory
   - body
   - foot
   - hand
   - head

2. Describe hearing protection, **their types, applications and use**.
   - muffs
   - plugs
   - combination
   - decibels (sound measurement)

3. Describe eye protection, **their types, applications and use**.
   - protection from light
   - protection from liquids
   - protection from solid objects
   - protection from hot objects
   - protection from compressed air

4. Describe respiratory protection, **their types, applications and use**.
   - respiratory system (inhalation)
   - air-purifying
   - self contained breathing apparatus

5. Describe body coverings, **their types, applications and use**.
   - Clothing material (natural/synthetic)
   - coveralls/Tyvek-suits
   - rain wear
   - winter garment (layering)
   - skin protection (sun/UV/corrosives, etc.)

6. Describe foot protection, **their types, applications and use**.
   - toe protection
   - arch protection
   - puncture protection
   - ankle protection

7. Describe hand protection, **their types, applications and use**.
   - temperature
   - abrasions
   - vibration
   - chemical

8. Describe head protection, **their types, applications and use**.
   - hard hat classification
   - liners
   - chin straps

9. **Describe** inspection and maintenance procedures for personal protective equipment.
   - hearing
   - eye

- respiratory
- body
- foot
- hand
- head

FALL PROTECTION

10. Identify types of fall prevention equipment **and describe their correct use and care.**
    - arrest
    - restraint
    - prevention

11. Describe **types of** fall arrest equipment, **their correct use and care.**
    - harnesses
    - life lines (horizontal/vertical)
    - rope grabs
    - lanyards
    - shock absorbers
    - tie-ins/anchor points
    - work over water
    - safety nets

12. Describe **types of** travel restraint equipment **and their correct use and care.**
    - harnesses/belts/1/2 harnesses
    - life lines (horizontal/vertical)
    - rope grabs
    - "Belly" hooks
    - Lanyards
    - Tie-ins/anchor points

13. Describe **types of** fall prevention systems **and their correct use and care.**
    - guardrails system
    - floor opening protection
    - wall openings

WORKING ENVIRONMENTS

14. Describe the hazards **and precautions to be taken when** working in a confined space.
    - health hazards
    - oxygen deficiency/enrichment
    - explosive atmospheres
    - IDLH (immediately dangerous to life or health)
    - emergency response

- retrieval devices
- monitoring equipment

15. Describe safe procedures for working in an excavation.
    - shoring
    - sloping/angle of repose
    - spoil pile
    - access
    - soil types
    - backfilling/compaction

16. **Describe precautions to be used when working in extreme conditions**.
    - heat stress
    - cold stress
    - hypothermia
    - dehydration
    - frost bite

17. Describe fire control equipment, **its applications and procedures for use.**
    - fire extinguisher classification
    - fire blankets
    - fire classification
        - A
        - B
        - C

INDUSTRIAL HEALTH HAZARDS

18. Identify types of industrial health hazards.
    - solid (dusts)
    - liquid
    - atmospheric
    - electrical
    - ergonomics

19. Identify ways hazardous materials enter the body.
    - absorption
    - inhalation
    - ingestion

20. Describe workplace hazardous materials.
    - compressed gases
    - flammables
    - poisons-acute/chronic
    - corrosives

- dangerously reactive
- oxidizers
- biohazardous
- WHMIS symbols
- Material Safety Data Sheet
- Hazardous fibres

21. Describe health hazards **presented by** building materials.
    - wood preservatives
    - dusts
    - heavy metals
    - off-gasing
    - fibres
    - **asbestos**

STATUTORY DOCUMENTS

22. Identify applicable health and safety legislation.
    - personal protection
    - signalling/flagging
    - fall protection
    - temporary support structures
    - working environment
    - harassment
    - health
    - material handling
    - rigging
    - confined space
    - access/egress
    - electrical hazards

23. Describe the requirements of the applicable health and safety legislation.
    - personal protection
    - signalling/flagging
    - fall protection
    - temporary support structures (scaffolding, falsework, etc.)
    - working environment
    - health
    - material handling
    - harassment
    - rigging
    - confined space
    - access/egress

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Select and demonstrate the proper use of personal protective safety equipment

CAR-0140 Construction Documents

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 2 and 3 and the National Carpenter Commonplace Curriculum unit A.4.1.

Description:

This course is designed to provide apprentices with the ability to interpret construction drawings, specifications, regulations and codes.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of construction drawings, specifications, regulations and codes
- demonstrate knowledge of communication techniques

Required Knowledge and Skills:

FUNDAMENTALS OF CONSTRUCTION DRAWINGS

1. **Identify and the different types of drawings, and describe their use and interpretation.**
   - blueprints
   - **architectural**
   - **structural**
   - **mechanical**
   - **electrical**
   - shop drawings
   - manufacturers supplied drawings

2. Interpret construction drawings.
   - architectural
   - structural

- shop and technical
- site and landscape

3. Identify construction specifications **and describe their purpose and use**.
   - general specifications
   - engineering specifications
   - regulations, legislations and by-laws

4. Identify construction regulations and codes.
   - building codes
   - standards
   - regulations, legislations and by-laws

5. **Describe the alphabet of lines.**
   - **object**
   - **broken**
   - **extension**
   - **dimension**
   - **centre**
   - **leader**
   - **break line**
   - **cutting plane**

6. **Identify and interpret blueprint symbols and abbreviation.**
   - **wall symbols**
   - **exterior**
   - **interior**
   - **mechanical**
   - **masonry**
   - **scale**

7. **Describe the parts of architectural drawings and their uses.**

READING CONSTRUCTION DRAWINGS

8. **Identify and describe the use of types of drawings.**
   - **plot**
   - **foundation**
   - **floor**
   - **elevation plans**
   - **roof**
   - **mechanical**
   - **manufacturers plans**

9. **Interpret and describe information on building plans.**

- **lines**
- **symbols**
- **dimensions**
- **elevations**
- **views**
- **abbreviations**
- **design**
- **window/door schedules**
- **sections**

10. **Identify and describe the use of elevation views.**
    - **front (north)**
    - **back (south)**
    - **right (east)**
    - **left (west)**

11. **Interpret and describe the use of information on elevation views.**
    - **orientation**
    - **grades**
    - **symbols**
    - **scale**

12. **Describe sections and details.**
    - **typical**
    - **wall**
    - **full**
    - **isometric details**

13. **Identify and** interpret **construction** specifications.
    - general specifications
    - engineering specifications
    - manufacturers specification
    - written field instructions

BASIC SKETCHING

14. **Explain the purpose of sketching.**
    - **communication**
    - **visualization**
    - **explaining details**

15. **Describe drafting tools and materials used for drawing plans.**

16. **Describe freehand sketching techniques.**
    - **lines**

- **proportion**
- **circles**
- **irregular shapes**

17. **Describe and** use communication techniques.
    - drawing symbols and convention
    - alphabet of lines
    - drawing views
    - drawing components
    - document hierarchy
    - computer assisted drawings
    - computer spreadsheets
    - computer estimating software

REGULATIONS AND CODES

18. **Describe the** regulations and codes **applicable to the trade**.
    - building codes
    - standards
    - regulations
    - legislation/by-laws
    - permits

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. **Identify and interpret information contained in construction drawings.**

2. **Sketch basic drawings.**
    - **freehand sketching**
    - **orthographic projection**
    - **isometric projection**

CAR-1145 Quantity Surveying

Reference:

The material covered satisfies in whole or in part the requirements of the National Occupational Analysis tasks 2 and 3 and the National Carpenter Commonplace Curriculum unit A.4.2.

Description:

This course is designed to provide apprentices with the knowledge and skills required to perform accurate estimates from construction drawings.

Prerequisites:

CAR-0140, 0160

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of commercial prints and their use in the trade
- demonstrate knowledge of the calculations, information and procedures used in preparing estimates

Required Knowledge and Skills:

COMMERCIAL BLUEPRINT READING

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. **Interpret information contained in documentation.**
   - **permits**
   - **specifications**

- **codes**
- **bids**
- **plans**
- **contracts**
- **engineered drawings**
- **manufacturers specifications**

3. **Describe the information contained in commercial blueprints.**
   - **alphabet of lines**
   - **symbols**
   - **sections**
   - **abbreviations**
   - **column line referencing**
   - **sheet referencing**
   - **typical details**
   - **notation**
   - **legends**
   - **scheduling**

ESTIMATING

4. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

5. **List the materials to be estimated for the following projects.**
   - **foundations**
   - **framing**
   - **exterior work**
   - **interior work**

6. **Describe the methods of calculation used to estimate materials.**
   - **area**
   - **volume**
   - **perimeter**
   - **lineal measurement**
   - **board footage**
   - **percentages**

7. **Explain the procedures to produce an accurate quantity take-off.**
   - **types of drawings**
   - **preparation**

- **processing information**
- **checklists**
- **cross referencing**
- **check-off system**
- **review information**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Take-off quantities from architectural drawings.
   - doors
   - hardware
   - fixtures
   - windows
   - framing materials
   - siding
   - sheathing
   - wall board
   - roofing
   - fasteners/sealants
   - architectural woodwork
   - insulation
   - membranes/barriers/papers
   - compile information on spread sheet

2. Take-off quantities from structural drawings.
   - concrete
   - anchor bolts
   - rebar
   - formwork

3. Take-off quantities from landscaping and site drawings.
   - excavations
   - landscape lumber
   - paving blocks
   - sidewalks
   - architectural specialities

4. Take-off quantities from electrical, mechanical and trade drawings.
   - concrete
   - excavation
   - anchor bolts

- miscellaneous inserts

CAR-1150 Building Science Principles

Reference:

The material covered satisfies in whole or in part the requirements of the National Occupational Analysis task 1 and the National Carpenter Commonplace Curriculum unit A.5.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe building science principles.

Prerequisites:

CAR-0100, 0105, 1110, 1115

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of building science principles, construction details and methods and their relevance to energy efficiency

Required Knowledge and Skills:

1. Describe methods of heat transmission.
   - conduction
   - convection
   - radiation
   - thermal bridging
   - R-valves/RSI-value

2. Describe methods of air flow
   - natural ventilation/mechanical ventilation.
   - infiltration/exfiltration
   - stack effect
   - flue effect
   - pressure differentials
   - air quality (radon gas and off-gassing, formaldehyde, carbon monoxide, nitrogen, particulates)
   - combustion air

- air changer per hour (ACH)

3. Describe methods of moisture flow.
   - phases of water (vapour, liquid and solid)
   - gravity flow
   - capillary action
   - vapour diffusion
   - air flow
   - relative humidity
   - condensation/dew point

4. Describe **methods of** sound transmission.
   - solid
   - water
   - gas
   - absorbed or reflected
   - vibration
   - reverberate
   - structure borne
   - airborne
   - sound transmission class (STC)
   - decibels
   - **measurement of sound**

5. Describe **the** forces related to the building envelope.
   - hydrostatic forces
   - weather forces (wind and rain)
   - atmospheric pressure
   - low/high pressure
   - shear force
   - compression, tension and torsion
   - uplift
   - gravity/**capillary actions**
   - occupants

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1155 Building Science Techniques

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 1 and the National Carpenter Commonplace Curriculum unit A.5.2.

Description:

This course is designed to provide apprentices with the knowledge and skills required to apply building science principles.

Prerequisites:

CAR-1150

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of selection and use of methods and materials based on building science principles

Required Knowledge and Skills:

1. **Describe techniques used to** control heat flow.
   - insulation - batt, loose, rigid and expansion foams
   - radiant barrier
   - caulking
   - passive solar design
   - R-2000
   - double wall construction
   - stressed skin panel construction
   - stand off wall construction
   - ventilation

2. **Describe techniques used to** control air flow.
   - air barriers (exterior/interior)
   - acoustical sealants/caulkings
   - sill gaskets
   - expanded foam

- tape (sealing tape)
- paint
- positive/negative pressures

3. **Describe techniques used to** control moisture flow.
   - barrier (water/vapour)
   - building paper
   - damp proofing / waterproofing membrane
   - mechanical ventilation
   - vapour diffusion retarder
   - eavestroughing
   - landscaping (grade)
   - flashings
   - drainage
   - sealants
   - paint

4. **Describe techniques used to** control interior and exterior forces.
   - bracing
   - structural integrity
   - water tables
   - sub-slab ventilation/drainage
   - control joints
   - rain screen
   - connectors/fasteners
   - sheathing methods

5. **Describe techniques used to** control sound transmission.
   - acoustical materials - plaster, tiles, cork and lead
   - staggered stud/party walls
   - acoustical sealant
   - resilient channel
   - double gypsum wallboard

6. **Describe energy efficient details of:**
   - **foundation**
   - **framing**
   - **windows**
   - **doors**
   - **exterior systems**
   - **interior systems**

7. **Describe insulation materials, their characteristics, applications and accessories.**
   - **batt**
   - **rigid**
   - **foam**

- **loose**
- **blown in**

8. **Describe the procedures and methods used in air sealing.**
   - **envelope**
   - **caulking**
   - **sealants**
   - **gasgets**
   - **tape**
   - **weatherstripping**
   - **foam**

9. **Describe the types of insulation and their advantages and disadvantages relating to:**
   - **energy efficiency**
   - **R-values**
   - **venting**

10. **Describe the relationship between drainage and energy efficiency, and the merits of different methods and procedures used in construction of drainage systems.**
   - **drain tile**
   - **down spouts**
   - **rain screen**
   - **landscaping**

11. **Describe the relationship between moisture control and various energy efficient construction methods.**
   - **relative humidity**
   - **natural ventilation**
   - **mechanical ventilation**
   - **moisture barrier**
   - **vapour barrier**

12. **Describe the operation of the house and its' components as a system.**
   - **moisture**
   - **relative humidity**
   - **environment**
   - **passive solar**
   - **heating/cooling systems**
   - **heat recovery ventilators**
   - **air exchangers**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-0160 Building Math/Geometry

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 1 to 17 and the National Carpenter Commonplace Curriculum unit A.5.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to perform mathematical and geometric operations used in the construction process.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of measurements and calculations used in carpentry
- demonstrate knowledge of metric and imperial systems

Required Knowledge and Skills:

1. Perform basic operations.
   - addition
   - subtraction
   - multiplication
   - division

2. Perform linear measurement.
   - imperial/metric
   - perimeter - rectangles, squares, circles

3. Calculate area/volume.
   - geometric shapes
   - fbm (foot board measure)

4. Calculate ratio/proportions.
   - like ratios
   - percentages

- mechanical advantage
- similar triangles

5. Apply geometric principles.
   - pythagorean theorem
   - trigonometry
   - bisecting angles/lines
   - ellipses/spring line
   - perpendicular/parallel lines

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-0165 Site Layout

Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 3 and the National Carpenter Commonplace Curriculum units A.6.1 & A.6.2.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify precision instruments, describe layout methods used in the construction process, and perform required calculations.

Prerequisites:

None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of precision instruments, their use and care
- demonstrate knowledge of elevations, grades and lines, and site layout calculations.

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Identify precision instruments.
   - levels
   - transits
   - theodolites
   - laser instruments
   - survey instruments
   - global positioning station (GPS)

- total station

3. Describe the layout process.
   - levelling
   - establishing lines
   - references

4. Calculate elevations and distances between lines.
   - fractions
   - decimals
   - fraction/decimal conversion
   - differential levelling
   - log book entry

5. Calculate angles and distances between points.
   - sine
   - cosine
   - tangent
   - pythagoras theorem
   - supplementary and complementary angles

6. Calculate arcs, tangents, chords and segments.
   - radius
   - diameter
   - circumference
   - radians

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Set up instrument.
   - levels
   - laser levels
   - transists/theodolites

2. Establish building lines.
   - lot lines
   - building lines
   - setback
   - batter board
   - batter line

- corner points
- hub stakes
- vernier

3. Use instruments.
   - transferring elevations
   - establishing elevations
   - layout angles
   - layout curves
   - measure distances
   - setting grades
   - field books/recording
   - measure angles

4. Construct batter boards.
   - independent
   - continuous
   - weighted
   - ledgers
   - stakes
   - braces
   - batter line
   - offsets

CAR-1170 Ladders and Ramps

References:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 1 & 3 and the National Carpenter Commonplace Curriculum unit A.7.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the construction and use of ladders, ramps, runways and stairs used in the construction process.

Prerequisites:

CAR-0100, 0105, 1115, 0160

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the various types of ladders, their use and care
- demonstrate knowledge of ramps, runways and stairs, their construction and use

Required Knowledge and Skills:

1. Describe the types of ladders.
   - manufactured ladders
   - job built ladders
   - regulations regarding ladder construction
   - fixed

2. Describe the safe use of ladders.
   - tie off
   - overlaps
   - base to height ratio
   - minimum extension
   - electrical hazards
   - safety feet
   - founding
   - ladder cages
   - rest platform
   - 3-point contact

- ladder jacks
- fall prevention

3. Describe ramps, runways and stairs.
   - widths
   - slope
   - handrails/guardrails
   - stepping laths (cleats)
   - tread rise and run
   - regulations

4. Describe construction standards for ladders, ramps, runways and stairs.
   - platform material
   - bearers (transoms/ledgers)
   - ribbons
   - uprights
   - braces
   - sills
   - stringers
   - treads
   - handrails/guardrails/toe boards
   - loading
   - rails/rungs

5. Describe the construction of ladders, ramps, runways and stairs.
   - job built ladders
   - temporary stairs
   - ramps
   - runways
   - handrails
   - guard rails

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1175 Access and Temporary Structures

References:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 1 & 3 and the National Carpenter Commonplace Curriculum unit A.7.2.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify access systems and temporary structures and describe the erection, maintenance and dismantling of scaffolds.

Prerequisites:

CAR-0100, 0105, 1115, 0160

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of access and temporary structures, their erection and safe use

Required Knowledge and Skills:

1. Identify access scaffolds structures.
   - independent and dependent
   - bird cage
   - rolling
   - cantilever

2. Identify access scaffold components.
   - sills
   - baseplates
   - screw jacks
   - standards
   - frames
   - transoms
   - ledgers
   - putlogs
   - braces (horizontal and vertical)

- planks (decks/grates)
- castors
- trusses
- u-heads
- outriggers
- end/side brackets
- connectors/couplers
- clamps
- uprights
- bearers
- ribbons
- farm wagons
- rails
- toe boards
- reveal pins

3. **Describe the various types of** loads on scaffolds.
   - live load
   - dead load
   - safe work loads
   - leg loads
   - ground loads
   - wind loads
   - static loads
   - rolling loads

4. Describe erection, maintenance and dismantling of independent scaffolding.
   - foundations
   - base lift
   - base to height ratio
   - tie-ins (horizontal and vertical)
   - light duty/heavy duty
   - bracing
   - guardrails
   - working lifts
   - access/egress
   - single and double pole
   - wood and metal

5. Describe the erection, maintenance and dismantling of bird cage scaffolding.
   - sills
   - bases
   - extension devices
   - braces
   - standards
   - ledgers

- transoms
- frames
- u-heads
- beams
- planks/plywood
- guardrails
- positive ties
- access to

6. Describe the erection, maintenance and dismantling of rolling scaffolds.
   - casters
   - frames
   - tube and clamp
   - fold down
   - outriggers
   - base to height ratio
   - access to platform
   - static load
   - rolling load
   - guardrails
   - toe boards
   - tipping
   - work platforms

7. Describe the erection, maintenance and dismantling of bridging and cantilever scaffolds.
   - knee braces
   - puncheon
   - check clamps
   - rakers
   - spurs

8. Describe the types of machine scaffolds.
   - scissor lifts
   - articulated booms
   - zooms
   - mast climbing scaffolds

9. Describe equipment set-up and operations.
   - scissor lifts
   - articulating booms
   - zooms
   - mast climbing scaffolds
   - inspection for maintenance

10. Describe bleachers and stages.
    - bleachers

- grand stands
- simple stages
- multi-level stages
- equipment towers
- canopies/awnings

11. Identify the components of bleachers and stages.
    - Sills
    - base plates
    - standards
    - ledgers
    - transoms
    - braces
    - screw jacks
    - bleacher bents
    - seats
    - seat backs
    - aisles
    - walkways/footboards
    - handrails/guardrails

12. Describe the loads and safety issues for stages and bleachers.
    - aisle widths
    - distance to exits
    - seat loads
    - live load/dead load
    - loading
    - seats

13. Describe the erection, maintenance and dismantling of bleachers.
    - layout
    - standard scaffold
    - bleacher bents
    - seats
    - steps
    - guardrails/handrails

14. Describe the erection, maintenance and dismantling of stages.
    - layout
    - standard scaffold equipment
    - beams
    - platform materials

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1180 Suspended Access Equipment

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 3 and the National Carpenter Commonplace Curriculum unit A.7.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify suspended scaffolds and access equipment and describe the erection, maintenance and dismantling of suspended scaffolds and access equipment.

Prerequisites:

CAR-0140, 1175

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the various types of suspended access equipment, their erection and safe use

Required Knowledge and Skills:

1. Describe suspended scaffolds.
   - swing stages
   - boatswain chairs
   - suspended scaffolds
   - hangers

2. Identify the components of suspended access equipment.
   - beams
   - rigging
   - counterweights
   - fall protection
   - climbers
   - descenders
   - guardrails
   - anchors
   - tie backs

- safety lines
- cables
- puncheons
- tie-ins
- beam clamps

3. Describe the loads and factors of safety on suspended access equipment.
   - rigging safety factor
   - equipment safety factor
   - safe work loads
   - live load
   - dead load
   - point load

4. Describe the erection, maintenance, and dismantling of boatswain chairs.
   - beams/thrustouts
   - rigging
   - counterweights
   - tie backs
   - descenders
   - fall prevention
   - anchors
   - balance point
   - ascenders

5. Describe the erection, maintenance and dismantling of swing stages.
   - beams/thrustouts
   - rigging
   - counterweights
   - tie backs
   - descenders
   - ascenders
   - fall protection
   - anchors
   - balance point
   - multi-point suspension

6. Describe the erection, maintenance and dismantling of suspended scaffolds.
   - rigging
   - beam clamps
   - multi-point suspension
   - platforms materials
   - trusses/beams
   - guardrails (toe boards)
   - hoarding
   - moving

7. Describe the erection, maintenance, and dismantling of hanging scaffold.
   - box ties
   - puncheons
   - rakers
   - guardrails
   - check clamps

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1185 Hoarding

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 3 and the National Carpenter Commonplace Curriculum unit A.7.4.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify the different types of hoarding and describe the construction and dismantling of hoardings.

Prerequisites:

CAR-0140, 1175

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the types of hoardings, their construction and dismantling.

Required Knowledge and Skills:

1. Describe the different types of hoardings.
   - environmental
   - containment

2. Describe the construction and dismantling of hoardings.
   - tarps
   - insulated tarps
   - poly
   - fibreglass
   - adhesives
   - heaters
   - ventilation
   - waste control

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1190 Footing, Slab-On-Grade and Grade Beam Forms

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 4 & 5 and the National Carpenter Commonplace Curriculum unit B.1.1 & B.2.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the construction and installation of grade beam, footing and slab-on-grade forms.

Prerequisites:

CAR-0100, 0105, 1110, 1115, 1130, 0135, 0140, 1145, 0160, 0165, 1170, 1175, 1185

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the various types of footings and forms, their construction and installation
- demonstrate knowledge of calculating concrete quantities

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Describe the footing, slab-on-grade and grade beam forms.
   - footing
   - stepped
   - tapered
   - battered
   - column
   - pilaster

- strip

3. Describe the construction of footing, slab-on-grade beam forms.
   - elevation/location
   - square forms
   - level forms
   - alignment (staking and bracing)
   - form ties
   - dismantling procedures
   - joints
   - reconditioning

4. **Describe different residential footing designs.**
   - **strip footing**
   - **stepped footing**
   - **T-shaped footing**
   - **tapered footing**
   - **battered footing**
   - **pier footing**
   - **column footing**

5. **Explain the function of footings with reference to:**
   - **loads**
   - **keyways**
   - **steps**
   - **slopes**

6. **Describe the construction of footings.**
   - **ground conditions**
   - **load factors**
   - **materials**
   - **forming techniques**

7. **Describe the procedures used to construct basic residential footings.**
   - **sizing**
   - **forming**
   - **squaring**
   - **levelling**
   - **bracing**
   - **rebar**
   - **placing concrete**
   - **curing**
   - **fasteners**
   - **stripping**

8. Calculate form materials.

- contact area
- sheet goods
- stud and waler material
- stakes and braces
- ties and wedges

9. Calculate concrete quantities.
   - centreline lengths
   - height
   - width

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Check elevation and location.
   - site plans
   - elevation view
   - plot plan
   - builder's level
   - bench mark

2. Construct forms.
   - layout
   - construction
   - bracing
   - alignment
   - spreaders
   - ties
   - templates

CAR-1195 Wall, Column, Pier and Pile Forms

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 4 and the National Carpenter Commonplace Curriculum units B.1.2 & B.2.2.

Description:

This course is designed to provide the carpenter apprentice with the knowledge and skills required to describe the construction and installation of wall, column, pier and pile forms.

Prerequisites:

CAR-0100, 0105, 1110, 1115, 1130, 0135, 0140, 1145, 0160, 0165, 1170, 1175, 1180, 1185

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of wall, column, pier and pile forms and their construction

Required Knowledge and Skills:

1. Describe wall, column, pier and pile forms.
   - steel
   - fibre
   - wood - stick & gang
   - tilt-up
   - architectural
   - insulated
   - composite
   - battered
   - expanded polystyrene (eps)
   - slip
   - pilaster

2. Describe the construction of wall, column, pier forms.
   - elevation/location
   - plates and collars
   - verticals
   - sheathing

- waler and strong backs
- ties
- blockouts - bucks, sleeves, inserts
- pour strips
- alignment and bracing
- lifting mechanisms
- access scaffold
- dismantling
- reconditioning
- joints

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Construct wall forms.
   - layout
   - side one
   - blockouts, bucks, sleeve, etc.
   - ties
   - reinforcing
   - side two
   - closed form
   - bracing
   - alignment
   - elevation
   - access scaffolding
   - form dismantling
   - place wall forms
   - templates
   - miscellaneous inserts
   - anchors

2. Construct column forms.
   - layout
   - column sides
   - chamfer strips
   - templates
   - ties
   - reinforcing
   - collars
   - clamps

- bracing
- kickers
- alignment
- elevation
- access scaffolding
- form dismantling
- place column forms
- miscellaneous inserts
- anchors

3. Construct pier forms.
   - layout
   - pier sides
   - templates
   - ties
   - reinforcing
   - collars
   - clamps
   - kickers
   - alignment
   - elevation
   - bracing
   - form dismantling
   - place pier forms
   - chamfer strips
   - miscellaneous inserts
   - anchors

CAR-1200 Stair Forms

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 6 and the National Carpenter Commonplace Curriculum units B.1.3 & B.2.4.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the construction and installation of stair forms.

Prerequisites:

CAR-0100, 0105, 1110, 1115, 1130, 0135, 0140, 1145, 0160, 0165, 1170, 1175, 1180, 1185, 1220, 1275

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of advanced types of forms and their installation procedures

Required Knowledge and Skills:

1. Describe stair types.
   - single flight open
   - single flight closed (1 or 2 sides)
   - winders
   - l-shaped - landing
   - u-shaped - landing
   - precast
   - circular

2. Describe the construction of stair forms.
   - layout
   - support
   - ties
   - risers
   - braces
   - soffit

- strong back
- inverted stringer
- multiple use (i.e. reuse, etc.)
- dismantling

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Layout stairs.
   - run
   - rise
   - soffit
   - landing
   - effective depth

2. Construct and place forms.
   - soffit form
   - side form
   - riser form
   - bracing
   - inverted stringer
   - strongback
   - shoring
   - dismantle form work and falsework

CAR-1205 Forms For Precast

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 1 & 4 and the National Carpenter Commonplace Curriculum unit B.1.4.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the construction of precast forms.

Prerequisites:

CAR-0105, 1110, 1115, 1130, 0135, 0140, 1145, 0160, 1170, 1175, 1180, 1185

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of forms for precast, their construction and use

Required Knowledge and Skills:

1. Describe forms for precast units.
   - insulated
   - non-insulated
   - prestressed
   - pretensioned
   - post tensioned
   - hollow core
   - tilt-up
   - cast in place - lift - slab
   - stairs
   - vault

2. Describe considerations when forming for precast.
   - layout
   - alignment
   - ties
   - architectural finish

- lifting systems
- dismantle
- reconditioning
- blockouts

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1210 Suspended Slab and Beam Forms

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 5 and the National Carpenter Commonplace Curriculum units B.1.5 & B.2.4.

Description:

This course is designed to provide apprentices with te knowledge and skills required to describe suspended slab and beam forms.

Prerequisites:

CAR-0100, 0105, 1110, 1115, 1130, 0135, 0140, 1145, 0160, 1170, 1175, 1180, 1185

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of suspended slab and beam forms

Required Knowledge and Skills:

1. Describe the various types of suspended slabs.
   - flat slab
   - flat plate
   - beam and girder
   - one-way joist
   - coffered
   - void slabs
   - prestressed

2. Describe the types of beams and capitals.
   - spandrel
   - girder
   - beam
   - joist
   - slab band
   - drop panel
   - capital

3. Describe falsework for suspended slabs and beams.
   - t-posts
   - ellis shores
   - adjustable steel shores
   - metal frame shoring
   - horizontal and diagonal components.
   - composite construction

4. Describe form systems and materials.
   - stick frame (loose frame)
   - steel pans
   - fibre glass pans
   - void forms
   - fly forms
   - composite

5. Describe the sequence of form construction for suspended slabs, beams and capitals.
   - sills
   - shoring
   - bracing
   - decking
   - bulkheads
   - ties
   - blockouts
   - inserts
   - joints

6. Describe the procedures for dismantling forms and removing supports.
   - pan removal
   - reshoring
   - form removal
   - temporary shores
   - permanent shores
   - reconditioning
   - back shoring

7. Describe the effects of concrete placement on the support systems.
   - sequencing (avoiding eccentric loading and uplifting)
   - pumped concrete
   - bucket concrete
   - gas buggy delivery

8. Describe the procedure for installing reinforcing materials.
   - grade and size
   - location and supports
   - main bars and ties

- connection methods

9. Describe the procedure for installing miscellaneous inserts, anchor bolts and templates.
   - elevation
   - location

HEAVY CONSTRUCTION FORM WORK

10. Describe relevant issues, practices and procedures relating to:
- **safety**
- **materials**
- **fasteners**
- **tools**
- **blueprint reading**
- **building science**
- **building codes**

11. Identify and describe types of formwork and accessories.
- **suspended slabs**
- **cast in place**
- **reinforcement**
- **piles**
- **shores**
- **cribbing**
- **columns**
- **beams/needle beams**
- **fly forms**
- **tilt-up forms**
- **lift slab**
- **slip forms**
- **false work**
- **ties**
- **walers**
- **braces**
- **panels**

12. Describe prefabricated (pre-cast) concrete systems and their construction.
- **casting beds**
- **site cast**
- **curtain walls**
- **pre-trimmed concrete**
- **post-trimmed concrete**
- **pre-stressed concrete**

13. Describe heavy construction procedures.
- **site preparation**
- **erecting different form systems**
- **stripping form systems**
- **installing accessories**
- **layout**
- **rigging**

14. Define terms used in heavy construction.
- **concrete terms**
- **forming terms**
- **accessory terms**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Establish location.
   - check engineer's drawings (blueprints)
   - layout lines

2. Construct falsework.
   - layout
   - mudsills and/or sleepers
   - shoring
   - stringers
   - alignment
   - bracing
   - levelling

3. Build forms and place reinforcing.
   - beam bottoms
   - beam sides
   - joists
   - decking
   - pans
   - voids
   - chamfer strip
   - hangers and inserts
   - reinforcing

4. Install miscellaneous inserts, anchors and templates.
- **chamfer strips**
- **reinforcing**

CAR-1215 Beams and Supports

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 6 & 7 and the National Carpenter Commonplace Curriculum unit C.1.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the function, construction and installation of beams and beam supports in framing and calculate materials required for a given project.

Prerequisites:

CAR-0100, 0105, 1110, 1115, 0120, 0125, 1130, 0135, 0140, 1145, 1150, 1155, 0160, 0165, 1170, 1175, 1180, 1185

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of beams and supports and procedures for their use in framing

Required Knowledge and Skills:

1. Describe beam supports.
   - beam end bearing
   - adjustable metal columns
   - lally columns
   - wood posts - built-up, solid, engineered
   - concrete
   - metal saddles

2. Describe the use of steel beams.
   - types
   - joist attachment
   - shrinkage space (NBC)
   - fire protection
   - shop priming

3. Define terms associated with beam design.
   - steel beam (i.e., I., h., c.)
   - manufactured beams (engineered)
   - built-up beams
   - box beams
   - clear span
   - supported joist length
   - quarter points
   - deflection
   - camber
   - compression
   - load (live, dead, static, design, allowable)
   - point load
   - shear
   - design tables
   - end bearing
   - flush beam
   - tension
   - torsion
   - neutral axis

4. Use tables to determine beam size, span and column spacing.
   - beam length
   - spans from desired column locations
   - point load locations
   - supported joist length
   - species, grade, size and number of members
   - joint locations and length of members required

5. Describe procedures of constructing built-up beams.
   - code requirements
   - material selection
   - crowns
   - post centres and quarter points
   - straightening procedures
   - laminations
   - nailing/fastener procedures

6. Identify and describe engineered beams.
   - types
   - advantages
     - allowable span
     - aesthetics
     - uniformity
     - versatility
     - stability

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1220 Framing 1 (Floor Framing)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7 and the National Carpenter Commonplace Curriculum units C.1.2 & C.2.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the construction and installation of floor and ceiling framing, the installation of floor sheathing and calculate materials required for a given project.

Prerequisites:

CAR-1215

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of floor framing components, their purpose, layout and installation
- demonstrate knowledge of various types of floor framing systems and their use
- demonstrate knowledge of floor sheathing and its installation

Required Knowledge and Skills:

1. **Describe the various floor framing methods and their applications.**
   - balloon
   - platform
     - wood
     - light gauge steel
   - **post and beam**

2. **Identify and describe** floor framing members.
   - **sills,** sill plate
   - **beams**
   - **columns**
   - floor joists
   - header joists
   - trimmer joists

- rim joists
- tail joists
- cantilever joists
- fasteners
- joist hangers
- ledgers
- **headers**
- cross bridging (herring bone)
- solid blocking
- skew blocking
- partition blocking
- point load blocking
- strapping (wood and metal)
- adhesives

3. **Explain the function of floor framing members.**
   - **loads**
   - **support**
   - **bracing**
   - **spans**

4. **Describe the criteria and procedures used to** select floor **framing members**.
   - drawings
   - design load
   - largest span
   - joist restraint method
   - joist spacing
   - grade and species to be used
   - joist size
   - design tables

5. Describe installation procedures for platform framing.
   - joist layout
   - foundation dimensions
   - foundation diagonals
   - sill plate
   - header and joist centres
   - opening locations (bay window location, floor openings, fire places, chases)
   - partition locations
   - mechanical locations
   - crown
   - joists nailing (attachment) procedures
   - fire cut
   - blocking, strapping and bridging
   - notching and drilling (as per NBC)

6. Describe installation procedures of light gauge steel floor framing.
   - joist layout

- joist connection
- opening connections
- joist attachment procedures and requirements
- channel splices
- blocking, stapping, and bridging

7. **Describe** engineered floor systems **and the methods and techniques used when working with engineered floor systems.**
   - open web truss (wood, metal, composite)
   - wood I-joist system
   - laminated systems
   - components (squash blocks etc.)
   - cutting and boring
   - **manufacturer's drawings and specifications**

8. Describe the methods and techniques used for installing floor systems with concrete tapping.
   - **loads**
   - **spacings**
   - **material sizes**

9. Describe the procedures used to construct and install beams and posts.

10. Describe procedures used to layout floor framing.

11. Describe floor sheathing and procedures for installation.
   - **types**
     - oriented strand board
     - **manufactured**
       - **sizing**
       - **properties**
     - plywood
     - board sheathing
       - **square edge**
       - **tongue and groove**
       - **sizes**
       - **shrinkage**
       - **diagonal**
   - thickness requirement
   - layout
   - **procedures**
     - **starting**
     - **staggering joints nails**
     - **expansion allowance**
     - **fasteners**
     - **adhesives**

12. Describe energy efficient floor framing.
    - recessed header joists
    - cantilever vapour barrier stops
    - elimination of rim joists (extended end walls)
    - preplacement of vapour barrier

13. Calculate floor frame material.
    - from drawings, specifications and code, calculate:
        - beam and joist size
        - beam component lengths
        - joist support and lengths
        - opening location and sizes
        - joist number and lengths
            - full length
            - headers
            - tails
            - stub
        - blocking, bridging, strapping, angle clips, stiffeners
        - supported partition supports
        - size and number of hangers
        - size of fasteners
        - fasteners and adhesives (amount)

14. Calculate floor sheathing material.
    - from drawings, specifications and code, calculate:
        - sheathing (type and thickness)
        - joint pattern
        - number of sheets or amount of material
        - fasteners (size and type)
        - fasteners and adhesive

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Construct and install beams and beam supports.
    - beam support layout
    - material selection
    - assembly
    - beam support erection
    - beam installation

2. Layout joist locations.
    - building size and layout direction

- sill, header, joist, plate
- openings, partition's, centreline, mechanical locations

3. Select and cut floor frame members.
   - joists
   - headers
   - bridging and blocking
   - tail joists
   - trimmer joist
   - rim joist

4. Assemble floor.
   - crowns
   - header location on trimmers and place
   - openings
   - joists
   - bridging, blocking, partition supports and joist hangers
   - floor sheathing
   - ensure all members are fastened according to code

CAR-1225 Framing 2 (Wall and Partition Framing)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7 and the National Carpenter Commonplace Curriculum units C.1.3 & C.2.2.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the construction and installation of wall and partition framing, the calculation of materials, and the installation of wall sheathing.

Prerequisites:

CAR-1220

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the construction and installation of wall and partition framing
- calculate materials
- demonstrate knowledge of wall sheathing and its installation

Required Knowledge and Skills:

WALL FRAMING

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Identify **and describe** framing systems.
   - platform frame, in-line framing
   - balloon frame
   - post, beam and plank

- heavy timber construction

3. Describe requirements of framing materials.
   - species
   - grade, gauge
   - moisture content
   - code requirements

4. **Identify and describe** wall framing member.
   - bottom plate (sole plate), track sections
   - top plate, track sections
   - cap plate (double plate)
   - stud
   - cripple
   - trimmer
   - jack
   - corner assembly
   - partition backing
   - fire stop
   - girt
   - header/lintel
   - partition
   - bearing wall
   - exterior wall
   - fire wall
   - party wall
   - accessory backing
   - ribbons, bracing
   - other walls (knee, pony, dwarf)

5. **Explain the function of wall framing members.**
   - **load bearing**
   - **non load bearing**
   - **bracing**
   - **spans**

6. Describe sequencing of wall framing.
   - exterior wall (longest to shortest)
   - partitions (longest to shortest)

7. **Describe the procedures used to locate and layout walls and partitions**.
   - wall locations
   - stud centres, align punch outs
   - plate locations
   - plate alignment
   - doors, windows and partitions (location)
   - mechanical and electrical considerations
   - clearance

- top plate overlap (corners, etc.)
- spacings
- column locations

8. Describe assembly procedures.
   - pre-assemble built-up components
   - stud placement
   - trimmer assemblies
   - headers
   - corner and partition assemblies
   - studs (check for crown-out), align punchouts
   - cripples and rough sills
   - girts and backing
   - code requirements for nailing
   - code requirements for lintels
   - cap plate (second top plate)
   - let-in bracing where required
   - ensure proper procedures for special framing requirements have been followed (i.e. framing for vaulted ceilings; bay windows; box outs; point load support, etc.)

9. **Describe the procedures used to build and erect wall frames.**
   - **planning**
   - **sequence**
   - **temporary bracing**

WALL SHEATHING

10. **Describe relevant issues, practices and procedures relating to:**
    - **safety**
    - **materials**
    - **fasteners**
    - **tools**
    - **blueprint reading**
    - **building science**
    - **building codes**

11. Describe sheathing applications.
    - sheathing (types and thickness)
    - plate alignment
    - square wall
    - stud spacing
    - opening locations
    - staggering joints and leaving ventilation space between rows
    - nail according to code

12. **Identify and describe the characteristics of various types of wall sheathing.**
    - **board**
    - **plywood**
    - **oriented strand board**
    - **rigid foam**
    - **insulated sheathing**

13. **Describe the characteristics of board sheathing.**
    - **square edge**
    - **tongue and groove**
    - **sizes**
    - **shrinkage**
    - **horizontal**
    - **diagonal**

14. Describe the characteristics of manufactured wall sheathing.
    - **manufacturing process**
    - **sizes**
    - **properties**
    - **R-value**

15. Describe erection procedures.
    - bracing and lifting (preparation)
    - lifting
    - bracing
    - straightening
    - nailing

16. Identify backing requirements.
    - ceiling backing
    - bath and kitchen fixtures
    - cabinets
    - mechanical (i.e. return air)
    - handrails, curtains, handicapped

17. **Describe the procedures used to install wall sheathing.**
    - **building paper**
    - **starting**
    - **bracing**
    - **staggering joints**
    - **fasteners**

18. Describe installation of steel stud framing.
    - load bearing - heavy gauge (14-20 gauge)
    - non-load bearing - light gauge (25 gauge)
    - track
    - studs
    - stiffeners

- resilient bars
- fasteners (crimpers) anchors
- wood backing
- bracing

19. Describe installation procedures for steel stud non-bearing partitions.
    - track layout and securement
    - stud attachment
    - rough openings
    - intersections
    - bracing
    - accessories

20. Describe installation procedures for steel stud load bearing walls.
    - code requirements
    - track
    - studs
    - fastening methods
    - bracing
    - sheathing attachment

21. Identify procedures for preserved wood foundations, must be engineer designed.
    - footings
    - stud size and spacing
    - sheathing materials
    - preservatives, sealants
    - alignment
    - drainage
    - backfilling - lateral pressures, bracing, moisture proofing, drainage systems
    - floor systems
    - tie floor to wall, blocking, anchors, etc.

22. Describe energy efficient wall framing.
    - oversized studs (i.e. 38 × 184)
    - double wall frame
    - horizontal strapping
    - stand-off wall system
    - manufactured wall systems
    - air barriers
    - avoiding thermal bridging

23. Calculate wall frame material.
    - from drawings, specifications and code, calculate:
        - plate material
        - stud (sizes and lengths)
        - number and size of openings
        - lintel (sizes and lengths)
        - lintel material

- cripple lengths and number
- full length studs
- lengths of rough sills
- backing and girts
- fasteners (length and amount)
- specialty hardware (i.e. uplift and earthquake)

24. Calculate wall sheathing material.
    - from drawings, specifications and code, calculate:
        - sheathing (type and thickness)
        - number of sheets or amount of material
        - fasteners (length and pattern)
        - fasteners and adhesive

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. **Determine framing member sizes based on the NBC standards.**

2. **Estimate wall framing materials.**
    - **calculate lineal measurement**
    - **calculate areas**
    - **calculate quantities Estimate materials**

3. **Layout and build wall systems.**
    - **spacings**
    - **openings**
    - **marking**
    - **fastening**
    - **scheduling**

4. Layout plates.
    - wall and partition locations
    - stud locations (o.c. spacing)
    - openings and additional studs for intersections, openings, etc.
    - backing

5. Cut and frame components.
    - full length studs
    - cripples, girts, backing, lintels, corner posts, intersection backing, stud-trimmer units
    - ensure all nailing is in accordance to code

6. Assemble walls.

- place components
- crown
- nailing sequence
- square wall
- let-in braces (if required)
- sheathing
- ensure all nailing is in accordance to code

7. Erect walls.
   - block-up
   - wall jacks (if required) and tilt-up wall
   - nail bottom plate
   - plumb and brace
   - erect all other walls and partitions in sequence
   - top plate tie-ins
   - straighten wall

CAR-1230 Framing 3 (Principles of Roof Framing)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7 and the National Carpenter Commonplace Curriculum units C.1.4 & C.2.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to understand basic roof framing principles. This information provides a basis for the design and building of various types of roofs.

Prerequisites:

CAR-1225

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of roof framing principles

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. **Explain the principles of roof framing.**
   - **right angle triangle**
   - **pythagorean theory**

3. Describe types of roofs **and their characteristics**.
   - gable
   - hip
   - flat

- **intersecting**
  - gambrel
  - mansard
  - butterfly
- shed
- domed or sphere
- gothic arch
- saw tooth
- clerestory
- dutch hip
- gull roof
- raker gable
- tapered raker

4. **Define roof framing terms**.
   - **total** rise
   - **total** run
   - overhang
   - **total** span
   - **rafter length**
   - unit rise
   - unit run
   - **unit** span
   - **pitch**
   - **slope/cut**
   - projection
   - snow load
   - wind load
   - deflection
   - slope ratio
   - live and dead loads
   - line length
   - unit line length

5. Describe ceiling and roof joist framing.
   - terms associated with roof joists and ceilings
   - joist size (spacing and spans from nbc)
   - joists (butting or lapping)
   - details for flush or dropped beams
   - end cuts of joists; stub joists for hip roofs; look-outs
   - strong backs and ribbons
   - parallel partitions
   - access openings and chimneys
   - notching and drilling

6. **Identify and describe roof framing members and their function.**

7. **Identify and describe relevant sections of the National Building Code.**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1231 Framing 4 (Gable Roof)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7 and the National Carpenter Commonplace Curriculum units C.1.4 & C.2.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to design gable roofs to meet code requirements, describe the construction and installation of roof framing, the installation of roof sheathing and calculate the amount of material required to frame and sheath a gable roof.

Prerequisites:

CAR-1225, 1230

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of gable roof layout, construction and material estimates

Required Knowledge and Skills:

1. Describe gable roofs.
    - terms - overhang, line length, flush gable (dropped), H clips, raked gable, rifge, ridge board, common rafter, plumb cut, seat cut, birds mouth, tail cut, rough fascia, total run, total rise, theoretical length, actual length, shortening of commons, plancier, rake rafter, look-outs, rafter tables, collar tie, unit run, unit rise, unit length, purlin, ribbon, allowable span projection
    - calculate common rafter length - establish run, establish slope, establish unit length, calculate theoretical length, calculate overhang
    - calculate and layout of gable studs
    - rafter layout
    - ridge layout
    - calculation and layout of collar ties
    - look-outs and rake rafter
    - sheathing application
    - rough fascia
    - temporary bracing

- the use of span tables for determining the size of rafter material

2. **Identify gable roof framing members and describe their purpose, characteristics and location.**
   - **common rafter**
   - **ridge**
   - **gable end studs**
   - **collar ties**
   - **ceiling joists**
   - **purlins**
   - **braces**
   - **rough fascia**

3. **Describe the methods of calculating rafter line length.**
   - **scale method**
   - **step off method**
   - **mathematical method**

4. **Describe layout procedures for a gable roof.**
   - **calculations**
   - **spacings**
   - **slope**
   - **line length method**
   - **step-off method**
   - **level/plumb lines**
   - **seat cut**
   - **overhang**
   - **shortening**
   - **common difference**

5. **Describe the procedures used to build and install a gable roof.**
   - **Calculate common rafter length**
   - **establish run, establish slope, establish unit length, calculate theoretical length, calculate overhang**
   - **calculate and layout of gable studs**
   - **rafter layout**
   - **ridge layout**
   - **calculation and layout of collar ties**
   - **look-outs and rake rafter**
   - **sheathing application**
   - **rough fascia**
   - **temporary bracing**
   - **the use of span tables for determining the size of rafter material**

6. Calculate gable roof material.
   - from drawings, specifications and code, calculate:
     - size of material required
     - length and number of commons

- ridge
- fascia material required
- intermediate rafter supports
- gable end framing
- look outs
- strapping
- gable sheathing
- roof sheathing (thickness and amount)
- fasteners (size and amount)
- H-clips
- soffit framing material
- collector blocks
- hold downs

7. **Describe the types of roof sheathing, the characteristics and applications of each.**
   - **board**
   - **plywood**
   - **oriented strand board**

8. **Describe the procedures used to install roof sheathing.**
   - **code references**
   - **starting**
   - **fastening**
   - **procedures**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Layout rafter locations.
   - tripod common
   - centre spacing
   - common and jack locations
   - ridge board

2. Layout and cut rafters.
   - lengths and overhangs
   - crown
   - ridge
   - commons (regular and end)
   - hips
   - hip jacks
   - valleys
   - valley jacks

- cripples
- lookouts
- fascias
- **assemble**
- **design**
- **calculations**
- **layout**
- **installation**
- **fastening**
- **code references**

3. **Calculate gable roof sheathing quantities.**
   - **board footage**
   - **linear measure**
   - **area**
   - **percentage**

4. **Install gable roof sheathing.**
   - **code references**
   - **fastening**
   - **starting**
   - **procedures**

5. Assemble gable roof.
   - studs
   - plates
   - common rafter
   - jacks
   - ridge
   - hips
   - commons
   - collar ties (common rafters)
   - knee walls
   - purlins
   - ribbons
   - strut's

CAR-1232 Framing 5 (Equal Slope Hip Roof)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7 and the National Carpenter Commonplace Curriculum units C.1.4 & C.2.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to design equal slope hip roofs to meet code requirements, describe the construction and installation of roof framing, the installation of roof sheathing and calculate the amount of material required to frame and sheath an equal slope hip roofs.

Prerequisites:

CAR-1225, 1230, 1231

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of hip roof layout, construction and material estimates

Required Knowledge and Skills:

1. Describe hip roofs.
   - terms - hip rafter, hip jack rafters, tripod, single cheek cut, end common, shortening of hips, shortening of hip jacks, double cheek cut, hip slope ratiio, working point (centreline), dropping or backing
   - calculate ridge length
   - calculate length of hip rafters
   - calculate length of hip jack rafters
   - hip rafter layout
   - hip jack rafter layout
   - ridge board layout
   - sheathing cuts
   - sheathing application

2. Describe trussed roofs and methods of assembly.
   - terms - top chord, bottom chord, web members, panel points, piggy back, gang nail, gusset, tension, hurricane clips, bow string, struts, ties, Howe truss, fink truss (w), scissor truss, king post truss, queen post truss, span, compression, heel, shear, arch

rib, girder, uplift, sloping flats, cantilever, mono truss, modified truss, gable truss, top chord bearing, torsion, split ring, shear plate, bay
- details found on manufacturer's drawings
- layout procedures
- erection procedures
- bracing (to specifications)
- partition fastening procedure
- truss ties
- specialty hardware and fasteners
- load transfer in trusses

3. Calculate hip roof material.
   - from drawings, specifications and code, calculate:
     - rafter material sizes
     - rafters (length and number)
     - total rafter material
     - intermediate rafter supports
     - fascia material
     - soffit framing material
     - sheathing (thickness and amount)
     - H-clips
     - fasteners (size and amount)
     - collector blocks

4. **Describe the procedures used to install roof sheathing.**
   - **code references**
   - **starting**
   - **fastening**
   - **procedures**
     - hold downs

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Layout rafter locations.
   - tripod common
   - centre spacing
   - common and jack locations
   - ridge board

2. Layout and cut rafters.
   - lengths and overhangs
   - crown

- ridge
- commons (regular and end)
- hips
- hip jacks
- valleys
- valley jacks
- cripples
- lookouts
- fascias
- **assemble**
- **design**
- **calculations**
- **layout**
- **installation**
- **fastening**
- **code references**

3. **Calculate hip roof sheathing quantities.**
   - **board footage**
   - **linear measure**
   - **area**
   - **percentage**

4. **Install hip roof sheathing.**
   - **code references**
   - **fastening**
   - **starting**
   - **procedures**

5. Assemble hip roof.
   - studs
   - plates
   - common rafter
   - jacks
   - ridge
   - hips
   - commons
   - collar ties (common rafters)
   - knee walls
   - purlins
   - ribbons
   - strut’s

CAR-1233 Framing 6 (Intersecting Roofs of Equal Slope)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7 and the National Carpenter Commonplace Curriculum units C.1.4 & C.2.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to design intersecting roofs of equal slope to meet code requirements, describe the construction and installation of roof framing, the installation of roof sheathing and calculate the amount of material required to frame and sheath an equal slope hip roof.

Prerequisites:

CAR-1225, 1230, 1231, 1232

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of intersecting roofs of equal slope roof layout, construction and material estimates

Required Knowledge and Skills:

1. Describe intersecting roofs.
    - terms - supporting valley (long), supported valley (short), valley jack, hip valley cripple jack, valley cripple jack, major ridge, minor ridge, hidden hip, shortened hip.
    - calculate length - long valley, short valley, minor ridge, valley jack, cripple jack length
    - calculate shortened hip
    - supported layout
    - unsupported layout
    - minor ridge layout
    - valley jack layout
    - hip valley cripple layout
    - valley cripple layout
    - shortened hip layout
    - temporary bracing methods

2. Calculate intersecting roof material.
   - from drawings, specifications and code, calculate:
     - rafter material sizes
     - rafters (length and number)
     - total rafter material
     - intermediate rafter supports
     - fascia material
     - soffit framing material
     - sheathing (thickness and amount)
     - H-clips
     - fasteners (size and amount)
     - collector blocks
     - hold downs

3. **Describe the procedures used to calculate and install roof sheathing.**
   - **code references**
   - **starting**
   - **fastening**
   - **procedures**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Layout rafter locations.
   - tripod common
   - centre spacing
   - common and jack locations
   - ridge board

2. Layout and cut rafters.
   - lengths and overhangs
   - crown
   - ridge
   - commons (regular and end)
   - hips
   - hip jacks
   - valleys
   - valley jacks
   - cripples
   - lookouts
   - fascias
   - **assemble**
   - **design**

- **calculations**
- **layout**
- **installation**
- **fastening**
- **code references**

3. **Calculate intersecting roof sheathing quantities.**
   - **board footage**
   - **linear measure**
   - **area**
   - **percentage**

4. **Install intersecting roof sheathing.**
   - **code references**
   - **fastening**
   - **starting**
   - **procedures**

5. Assemble intersecting roofs.
   - studs
   - plates
   - common rafter
   - jacks
   - ridge
   - hips
   - commons
   - collar ties (common rafters)
   - knee walls
   - purlins
   - ribbons
   - strut's

6. Assemble intersecting roofs of equal slope.
   - tripod at each end of the ridge (3 commons and ridge)
   - hips
   - hip jacks
   - commons
   - valleys
   - valley jacks
   - cripples
   - gable
   - minor rafters
   - ladder
   - collar ties and fascia
   - sheathing
   - roof vents
   - ensure all members are nailed in accordance to code

CAR-1234 Framing 7 (Special Roofs)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7 and the National Carpenter Commonplace Curriculum units C.1.4 & C.2.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to design various types of special roofs to meet code requirements, describe the construction and installation of roof framing, the installation of roof sheathing and calculate the amount of material required to frame and sheath various types of special roofs.

Prerequisites:

CAR-1225, 1230, 1231, 1232, 1233

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of various types of special roof layout, construction and material estimates

Required Knowledge and Skills:

1. Describe special roofs and features.
   - terms - dormer (all), turret, cricket (saddle), unequal slope, comparative slope drawing, parapet, cupola, cant strip, canopy, spire, polygon roofs, saw tooth, false gable, roof drains
   - dormer framing methods - shed, gable, eyebrow
   - unequal slope roof framing methods

2. Calculate materials for various special roofs.

3. Describe energy efficient roof framing.
   - raised heeled rafters and trusses
   - installation of insulation stops

4. Calculate ceiling frame material.
   - from drawings, specifications and code, calculate:

- beam and joist size
- beam component lengths
- joist support and lengths
- opening location and sizes
- joist number and lengths
    - full length
    - headers
    - tails
    - stub
- partition supports
- ceiling backing

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Assemble intersecting roofs of unequal slope.
    - ridges
    - common
    - valleys
    - valley jacks
    - cripples
    - sheathing
    - comparative slope drawing
    - raised plate

2. Assembles truss (manufactured component) roofs.
    - layout
    - bracing
    - nailing procedures
    - placement
    - truss ties

CAR-1235 Framing 8 (Timber Framing)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7.

Description:

This course is designed to provide apprentices with the knowledge and skills required to describe the materials and methods used in timber frame construction.

Prerequisites:

CAR-1220

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- **demonstrate knowledge of timber framing**

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. **Identify and describe types of timber framing.**
   - **post and beam**
   - **continuous**
   - **superimposed**
   - **pole construction**

3. **Identify and describe timber frame components and their function.**
   - **beams**
   - **columns**

- **adhesives**
- **connectors**
- **purlins**
- **declines**
- **braces**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

CAR-1236 Windows 1 (Exterior)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 9 and the National Carpenter Commonplace Curriculum units D.1.1 & D.2.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify and describe installation of different types, components and hardware for windows.

Prerequisites:

CAR-0100, 0105, 1115, 1130, 0135, 1170, 1175, 1180, 1185, 1225

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of materials and procedures used to plan and install exterior windows

Required Knowledge and Skills:

1. **Describe the function of windows and accessories.**
   - **appearance**
   - **light**
   - **ventilation**
   - **security**
   - **energy efficiency**
   - **weather protection**
   - **code references**

2. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

3. **Identify and** describe types of windows.
   - vertical slide windows
   - horizontal slide windows
   - transom windows
   - bow windows
   - bay windows
   - awning/hopper windows
   - casement windows
   - hoppers
   - **jalousie**
   - **low-E**
   - **double/triple glazed**
   - sky lights

4. Describe **the** components of windows **and their purpose**.
   - types of materials (wood, PVC, metal, **fibreglass**, clad)
   - NBC requirements
   - parts of a frame
   - **sashes**
   - **rails**
   - **weather stripping**
   - glazing
     - spacers
     - gas fills
     - coatings
     - weather stripping
   - flashing
   - hardware
   - **stops**
   - energy rating of windows

5. Describe installation procedures for windows.
   - elevation
   - plumb, level, square and straighten
   - fastening methods
   - building paper
   - drip cap
   - flashing
   - caulking
   - air barrier tape
   - insulation
   - backer rod
   - energy efficient sealing of windows

6. **Describe the procedures used to install accessories.**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Prepare openings.
   - verify rough opening (dimensions, plumb, level and square)
   - window schedule
   - perimeter fastenings for sheathing
   - air and moisture barriers

2. Install windows.
   - spacers
   - shims
   - square unit using shims
   - fasteners
   - hardware
   - sash
   - adjustment

CAR-1237 Windows 2 (Interior Trim)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 14.

Description:

This course is designed to provide apprentices with the required knowledge and skills to identify and describe installation of window trim and trim components.

Prerequisites:

CAR-1236

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- **demonstrate knowledge of materials and procedures used to plan and install exterior windows**

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. **Identify and describe window trim and its functions.**
   - **casing**
   - **stools**
   - **aprons**
   - **corner blocks**
   - **stops**
   - **jamb extensions**

3. **Describe the installation procedures for window trim.**

- **layout**
- **marking**
- **fitting**
- **fasteners**
- **adhesives**
- **mitres**
- **joints**
- **scribing**
- **returns**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Install window trim.

CAR-1240 Roof Coverings

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 10 and the National Carpenter Commonplace Curriculum units D.1.2 & D.2.2.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify roof covering materials, roofing accessories and describe the installation of roof coverings.

Prerequisites:

CAR-0100, 0105, 0120, 1130, 0135, 0140, 1145, 1150, 1155, 0160, 1170, 1175, 1180, 1185, 1230

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of materials and procedures used to plan and install roof coverings

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. **Identify** the types **and** describe **the characteristics of common** roof coverings.
   - roll roofing
   - synthetic roofing (hardboard, asphalt, vinyl etc.)
   - **asphalt shingles**
   - corrugated metal
   - built up roofing
   - tiles
   - wood shingles and shakes

3. **Describe the procedure used to estimate quantities.**
   - **area**
   - **lineal measure**
   - **percentage**

4. **Describe the installation procedures for common roof coverings.**
   - **surface preparation**
   - **building paper**
   - **eave protection**
     - materials
     - ice dam
     - leakage prevention
     - ventilation-ice dam
     - fasteners
     - NBC requirements
     - starter strips
   - **openings**
   - **ventilation**
   - **references**
   - **fastening**

5. Describe installation procedures for roofing accessories.
   - step flashings
   - valley flashings
   - drip edge
   - counter flashing
   - soaker
   - gravel stop
   - plumbing boots
   - sealants
   - caulking
   - fasteners
   - snow stop
   - centre drain

6. Describe installation procedures for roof coverings.
   - inspect roof coverings
   - layout
   - underlayment
   - fasteners
   - adhesives
   - roof coverings
   - roof vents - static, power assisted, ridge vents, wind turbine and exhaust, sealant, caulking and fasteners/fastenings.

7. Calculate roof covering materials.
   - underlayment
   - shingles (wood, asphalt, etc.)

- rolled roofing
- metal roofing
- tiles
- eave protection

8. Calculate roofing accessories.
   - roofing cement (9" strips) adhesives
   - roof venting requirements
   - starter strips
   - flashings
   - caps
   - ridge vent
   - snow stop

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Install roof coverings.
   - roof surface preparation
   - layout
   - underlayment
   - eave protection
   - starter
   - flashings (valley)
   - adhesives
   - fastenings
   - caps (ridge & hip)

2. Install roofing accessories.
   - roof flashing
   - roof vents/ridge vents
   - plumbing boots
   - snow stops

3. **Install common roof coverings.**

CAR-1245 Wall Coverings and Trim

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 12 and the National Carpenter Commonplace Curriculum units D.1.3 & D.2.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to identify exterior wall coverings, trim and accessories and describe the installation of exterior wall coverings, trim and accessories.

Prerequisites:

CAR-0100, 0105, 1110, 1115, 0120, 1130, 0140, 1145, 1150, 1155, 0160, 1225,

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of materials and procedures used to plan and install exterior trim
- demonstrate knowledge of siding materials, their applications and installation

Required Knowledge and Skills:

WALL COVERINGS

1. Describe types of modern exterior wall coverings.
   - wood siding
   - concrete/metal/synthetic siding
   - stucco
   - lath
   - pre-cast
   - brick veneers
   - exterior insulation finishing systems (EIFS)
   - parging

2. Describe types of exterior trim and accessories.
   - cornice components
   - projecting components
   - window/door trim components

- special wall trim (dryer vents, hose bibs, etc.)

3. Describe installation procedures for wall coverings, trims and accessories.
   - selection (drawings, specifications, code requirements, vertical and horizontal)
   - preparation (wall preparation and layout)
   - rain screen (procedures)
   - installation (speciality tools, fastening and procedures)

4. Calculate materials.
   - calculate linear measure
   - starter strip
   - drip cap
   - inside/outside corner
   - undersill trim
   - j-trim
   - strapping
   - fascia
   - watertable
   - casings
   - frieze boards
   - barge boards
   - half timber work
   - brick mould

5. Calculate area measure.
   - siding coverage (exposure)
   - building paper/house wrap
   - gable ends
   - reduction for openings
   - percentage waste
   - soffit
   - ventilation

WOOD SIDING

1. Describe relevant issues, practices and procedures relating to:
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Identify types of wood siding and describe their applications.
   - **horizontal board**
   - **vertical board**
   - **shingles**

- **shakes**
- **wood panelling**
- **composite siding**

3. **Discuss the characteristics of wood siding as a material.**
   - **moisture content**
   - **grain**
   - **moisture**
   - **grades**
   - **shrinkage**
   - **shrinkage**
   - **expansion/contraction**
   - **durability**
   - **maintenance**

4. **Discuss the procedures used to install wood siding.**
   - **building paper**
   - **laying starting course**
   - **preparing surface**
   - **starting point**
   - **storey pole and jigs**
   - **coursing**
   - **openings**
   - **corner details**
   - **flashing**
   - **furring**
   - **back priming**
   - **fasteners and accessories**
   - **rain screen**

VINYL AND METAL SIDING

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. **Identify types of vinyl siding and describe their characteristics.**
   - **horizontal**
   - **vertical**

3. **Describe vinyl siding accessories and their function.**
   - **starter strip**
   - **J-trim**

- **F-trim**
- **undersill**
- **drip cap**
- **soffit**
- **fascia**
- **corners**

4. **Describe the characteristics of vinyl siding as a material.**
   - **properties**
   - **ultraviolet sensitivity**
   - **expansion**
   - **durability**

5. **Describe the procedures for the installation of vinyl siding and accessories.**
   - **blueprints**
   - **building paper**
   - **preparing surface**
   - **starting point**
   - **horizontal siding**
   - **vertical siding**
   - **openings**
   - **corner details**
   - **flashing**
   - **furring**
   - **trim**
   - **soffit**
   - **fascia**
   - **accessories**

METAL SIDING

15. **Describe the characteristics of metal siding as a material.**
   - **properties**
   - **expansion**
   - **durability**

16. **Identify and describe types of metal siding and their characteristics.**
   - **horizontal**
   - **vertical**
   - **aluminum**
   - **steel**

17. **Describe the procedures used to install metal siding.**
   - **blueprints**
   - **building paper**
   - **preparing surface**
   - **starting point**
   - **horizontal siding**

- **vertical siding**
- **openings**
- **corner details**
- **flashing**
- **furring**
- **accessories**

STUCCO

18. Describe relevant issues, practices and procedures relating to:
- **safety**
- **materials**
- **fasteners**
- **tools**
- **blueprint reading**
- **building science**
- **building codes**

19. Discuss the characteristics of stucco.
- **properties**
- **expansion**
- **durability**

20. Describe the procedures used to install stucco.
- **blueprints**
- **building paper**
- **preparing surface**
- **starting point**
- **base material**
- **metal lathe**
- **openings**
- **corner details**
- **flashing**
- **furring**
- **accessories**
- **rain screen**

EXTERIOR TRIM

21. **Describe relevant issues, practices and procedures relating to:**
- **safety**
- **materials**
- **fasteners**
- **tools**
- **blueprint reading**
- **building science**
- **building codes**

22. **Identify and describe exterior trim components, their location and purpose.**
    - **cornices**
    - **fascia**
    - **soffit**
    - **mouldings**
    - **belt course**
    - **water table**
    - **drip caps**
    - **gutters**
    - **returns**
    - **dentils**
    - **corner boards**

23. **Describe the function of exterior trim.**
    - **decoration**
    - **appearance**
    - **design**
    - **profiles**
    - **drainage**
    - **protection**

24. **Describe the installation procedures for exterior trim.**
    - **sequencing**
    - **fastening**
    - **levelling**
    - **back priming**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. **Install exterior trim.**

2. Prepare wall surface.
    - sheathing and fastening
    - building paper/house wrap
    - air barrier sealing
    - furring strips
    - insect screens
    - stucco wire
    - wire lath
    - rain screens

3. Install trim.

- layout
- joints
- cornice
- barge board
- soffit
- vents
- fascia
- frieze
- moulding
- brick mould
- drip cap/head casing
- corner board
- side casing
- window sill
- water table
- half timber work
- dentils
- brackets

4. Install siding accessories.
   - inside/outside corners
   - starter strip
   - j-mould
   - flashings, drip cap
   - under-sill trim, f-trim
   - caulking
   - expansion joint

5. Install siding.
   - nailing requirements
   - expansion allowance
   - selection of fasteners
   - cutting methods
   - storey pole layout
   - exposure

6. **Calculate quantities, plan and prepare for the installation of sidings.**

7. **Install wood shingles single course, double course, horizontal board and vertical board.**

8. **Install horizontal and vertical vinyl siding.**

9. **Plan and prepare for a wood siding job.**

CAR-1250 Flooring

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 11 and the National Carpenter Commonplace Curriculum units E.1.1 & E.2.1.

Description:

This course is designed to provide apprentices with the knowledge and skills required to plan and install flooring.

Prerequisites:

CAR-0100, 0105, 0120, 1130, 0135, 0140, 1145, 1150, 1155, 0160, 1255, 1260

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of residential floor coverings, materials and procedures used for planning and installation

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**

2. Identify **and describe the characteristics of various types of residential floor coverings.**
   - **hardwood**
   - **softwood**
   - species of wood-grade
   - milling techniques - edge grain, flat grain, quarter sawn, flat sawn, plain sawn, square edge, tongue & groove, sizes.
   - wood flooring - strip, parquet, laminated, prefinished, plank
   - resilient flooring - rolled resilient, vinyl composite tile

3. Identify **and describe** types of specialized flooring.
   - access flooring
   - gymnasium flooring
   - bowling alley flooring
   - **parquet**
   - floating floor

1. **Describe the** types, **characteristics and use of** flooring accessories.
   - fasteners and adhesives:
     - **screws**
     - **nails**
     - **latex based adhesives**
     - **solvent based adhesives**
     - **finishes/sealers**
     - **levels of toxicity**
   - sleepers
   - sealants/finishes
   - vinyl base
   - **underlayment**

2. **Describe the procedures used for preparation and installation of flooring.**
   - subfloor preparation
   - climatizing
   - storage & handling
   - **reference lines and** layout
   - **preparation of materials**
   - fasteners
   - adhesives
   - sanding/finishing

3. Explain advantages and disadvantages of various fasteners and adhesives.
   - screws
   - nails
   - latex based adhesives
   - solvent based adhesives
   - finishes/sealers
   - levels of toxicity

4. Calculate flooring materials.
   - area
   - quantities
   - percentage of waste
   - linear measure
   - balancing

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the

objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Prepares subfloor.
   - subfloor inspection
   - sand surfaces
   - moisture barrier

2. Installs sleepers.
   - air/vapour barriers
   - shims
   - fasteners

3. Layout reference points and guidelines.
   - direction of run
   - balancing borders
   - squaring
   - starting point
   - patterns

4. Selects and installs wood flooring.
   - strip flooring
   - parquet flooring
   - laminated flooring
   - prefinished
   - expansion
   - climatizing
   - fastening
   - adhesives
   - racking
   - scribing
   - cutting

5. Select and install underlayment.
   - plywoods
   - gypsum board
   - composition board
   - layout
   - starting point
   - expansion
   - flush joints
   - breaking joints
   - fasteners
   - adhesives
   - door openings

6. Install vinyl and rubber base.

- internal and external corners
- seamless base
- adhesives

7. **Plan and carry out the installation of a hardwood floor.**

CAR-1255 Wall Coverings

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 12 and the National Carpenter Commonplace curriculum units E.1.2 & E.2.2.

Description:

This course is designed to provide apprentices with the knowledge and skills required to plan and install interior wall coverings and accessories.

Prerequisites:

CAR-0135, 1170, 1175, 1260

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of residential wall coverings, materials and procedures used for planning and installation

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

GYPSUM WALL COVERINGS

2. Identify **and describe the characteristics** of gypsum **interior wall coverings.**
   - size
   - edge profiles
   - moisture resistant
   - cementitious board
   - lead lined board
   - fire rated

- predecorated
- plaster lath
- foil back

3. Describe installation procedures for gypsum wall board.
   - single application
   - fasteners
   - adhesives
   - causes of nail popping
   - laminated application
   - bending drywall sheets
   - predecorated application
   - acoustical application
   - NBC
   - airtight drywall approach
   - openings
   - furring
   - floating corners
   - horizontal/vertical applications

4. Describe **the materials and procedures used to** tape and fill joints **in gypsum wall coverings.**
   - materials
     - types of tape
     - joint compound
   - procedures
     - filling
     - sanding
     - finishing techniques

5. Identify **and describe** gypsum wall board accessories.
   - corner beads
   - mouldings
   - fasteners
   - control joints
   - acoustic sealants
   - gaskets
   - access panels
   - resilient channel
   - fasteners
   - metal mesh
   - grounds

NON-GYPSUM WALL COVERINGS

6. Identify **and describe the types and their characteristics** of non-gypsum **interior residential** wall coverings.
   - **plaster**

- plywood
- lumber
- cork board
- tile
- panelling
- composition board
- laminates
- acoustic panelling

7. Identify accessories for non-gypsum wall coverings **and describe their applications.**
   - mouldings
   - fasteners
   - adhesives

8. Describe procedures used to install non-gypsum wall coverings and accessories.
   - matching
   - balancing
   - layout
     - **reference points**
     - **starting point**
   - **prepare surfaces**
   - **select and use** fasteners
   - **select and apply** adhesives
   - scribing
   - cutting and fitting
   - openings
   - corners
   - joints/grout
   - furring
   - plumb and level
   - wainscotting

9. Calculate wall covering material.
   - area
   - quantity
   - percentage of waste
   - linear measure
   - balancing

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Prepare wall surfaces.
   - straightness
   - backing
   - vapour barrier
   - protrusions

2. Install gypsum wall board and accessories.
   - fasteners
   - layout
   - methods of cutting
   - NBC
   - corner bead
   - moulding
   - control joints
   - metal mesh
   - acoustic sealants
   - gaskets
   - access panels
   - resilient channels
   - fasteners
   - grounds

3. Install non-gypsum wall coverings and accessories.
   - storage and handling
   - surface preparation
   - layout
   - climatization
   - scribe fit
   - fit
   - fastenings
   - finish preparation
   - mouldings
   - scribing
   - coping
   - fasteners
   - adhesives
   - balancing

CAR-1260 Ceilings

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 13 and the National Carpenter Commonplace Curriculum units E.1.3 & E.2.3.

Description:

This course is designed to provide apprentices with the knowledge and skills required to plan and install ceilings and systems.

Prerequisites:

CAR-1110, 1170, 1175

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of residential ceiling coverings, materials and procedures used for planning and installation

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Identify types of suspended ceilings.
   - acoustical
   - concealed grid
   - exposed grid
   - semi-concealed
   - suspended drywall
   - linear systems
   - fire rated - NBC

3. Identify components of suspended ceilings.
   - fasteners/anchors
   - suspension wire
   - wire ties
   - channels
   - main tees
   - cross tees/ splines
   - wall mould
   - hold down clips
   - tiles

4. Describe the installation procedures for suspended ceilings.
   - reflective ceiling plan
   - balancing
   - elevation
   - components
   - sequence of installation
   - bending and tying
   - cutting and fitting
   - levelling
   - tiles
   - splicing grid
   - acoustical
   - fire rating

5. Identify **and describe interior** ceiling **coverings.**
   - gypsum board
   - composition ceiling tiles
   - solid wood/panelling

6. Identify **and describe** components of non-suspended ceilings.
   - furring
   - battens
   - moulding
   - fasteners
   - adhesives
   - tiles
   - panels
   - gypsum board
   - lumber
   - balancing

7. Describe **the preparation, layout and** installation procedures for ceiling **coverings and accessories.**
   - **starting point**
   - **references lines**
   - **level**
   - strapping

- furring
- shimming
- elevation
- leveling
- layout
- balancing
- cutting
- fitting
- pattern
- storage and handling
- climatizing
- fire rated
- NBC
- fasteners
- **adhesive**
- **code references**

8. Describe purposes of drop ceilings and bulkheads.
   - architectural features
   - cabinet projections
   - conceal mechanical and electrical fixtures
   - conceal structural components
   - fire protection

9. Describe construction methods associated with drop ceilings.
   - layout
   - elevations
   - framing details
   - coverings
   - adhesives
   - fasteners
   - finishes

10. Calculate ceiling materials.
    - area
    - quantity
    - percentage of waste
    - balancing
    - linear measure

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Install suspended ceilings.
   - elevation
   - layout
   - centre lines
   - patterns
   - balancing
   - levelling
   - reference lines
   - fasteners
   - hangers
   - anchoring components
   - grid

2. Install non-suspended ceilings.
   - layout
   - pattern
   - fasteners
   - balancing
   - strapping/furring
   - shims
   - elevation
   - T-shore
   - moulding
   - adhesives

3. Install drop ceilings and bulkheads.
   - elevations
   - layout
   - strapping/furring
   - shims
   - reference lines
   - framing
   - fire proofing

CAR-1265 Doors and Jambs

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 9 to 14 and the National Carpenter Commonplace Curriculum units E.1.4 & E.2.4.

Description:

This course is designed to provide apprentices with the knowledge and skills required to select and install doors and frames.

Prerequisites:

CAR-0100, 0105, 0120, 1130, 0135, 0140, 1145, 1150, 1155, 0160

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of doors and door frames and their installation

Required Knowledge and Skills:

INTERIOR DOORS

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Identify types of door jambs and frames.
   - board jambs
   - rabbeted jambs
   - split jambs
   - metal frames
   - knock down frames
   - transom frames
   - side light frames

3. Identify components of door jambs and frames **and describe their purpose**.
   - head jamb
   - side jambs
   - threshold
   - stops
   - brickmould
   - muntin
   - casing
   - mullion
   - sill

4. Describe installation procedures for door jambs and frames.
   - frame preparation
   - opening size
   - hand of door
   - fastening
   - squaring
   - plumbing
   - levelling
   - shimming
   - bracing
   - spreading
   - aligning (wind) the jamb
   - flashings

5. Identify types of interior and exterior doors **and describe their characteristics and applications.**
   - **interior**
     - bifold
     - **bipass**
     - double action
     - french door
     - panel**led** door
     - prehung
   - **exterior**
     - hollow core
     - solid core
     - slab
     - fire rated
     - panel door
     - hollow metal
     - french door
     - dutch door
     - double action
     - insulated
     - patio (horizontal/sliding door)
     - prehung

- combination
- storm/screen

6. Describe the installation procedures for doors.
   - opening size
   - opening preparation
   - hand of door
   - door selection
   - clearance
   - hardware
   - operation
   - templates

7. Identify types of special doors **and describe their characteristics and applications.**
   - overhead
   - accordion
   - bi-pass
   - bi-fold
   - pocket
   - rolling shutter
   - louvre

8. Describe installation procedures for special doors.
   - opening size
   - opening preparation
   - manufacturer's specifications
   - fasteners and anchors
   - door and hardware adjustments

9. Calculate door and jamb materials.
   - quantities
   - size of jambs
   - length of header
   - length of side jamb
   - length of sill

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Assemble door jambs and frames.
   - interior
   - exterior
   - fasteners

- caulking
- flashing
- hangers
- spreaders
- bracing
- knockdown frames
- dadoes
- rabbets

2. Install door jambs and frames.
   - square
   - plumb
   - level
   - spreaders
   - shims
   - brace
   - align
   - horns
   - stops
   - flashing
   - caulking
   - building envelope

3. Install doors.
   - overheads
   - bi-fold
   - bi-pass
   - pocket
   - accordian
   - slab
   - verify opening
   - prepare opening
   - hand of door
   - clearances
   - hardware
   - troubleshoot
   - pre-hung unit
   - stops
   - fasteners

CAR-1270 Hardware, Accessories and Fixtures

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 9 & 14 and the National Carpenter Commonplace Curriculum units E.1.5 & E.2.5.

Description:

This course is designed to provide apprentices with the knowledge and skills required to select and install door hardware and accessories and architectural fixtures.

Prerequisites:

CAR-1265

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of door hardware and accessories and architectural fixtures and their installation.

Required Knowledge and Skills:

HARDWARE

1. Identify and describe the installation of various types of hinges.
   - butt
   - continuous
   - double-action
   - spring loaded
   - non removable pin (N.R.P.)
   - surface
   - half-surface
   - pivot
   - concealed
   - mortise
   - half mortise
   - ball bearing

2. Identify and describe the installation of various types of lock sets.
   - mortise

- cylindrical
- tubular
- dead bolt
- functions
- electric
- mechanical coded
- exit
- **latches**

3. Identify and describe the installation of various types of closers & operators.
   - hydraulic
   - pneumatic
   - spring loaded
   - electric
   - **strikers**

4. **Describe the procedures used to install hardware.**
   - **layout**
   - **drilling**
   - **gains**
   - **mortising**
   - **fasteners**

5. Identify and describe the installation of various types of hardware.
   - astragal
   - surface bolt
   - flush bolt
   - stops
   - sweeps
   - pull/push plates/handles
   - kick plates
   - weather strip
   - hold open
   - threshold
   - viewer
   - silencer
   - co-ordinator

ACCESSORIES

6. Identify and describe the installation of different types of fixtures and accessories.
   - washroom fixtures
   - toilet partitions
   - dispensers
   - lockers
   - kitchen accessories
   - classroom accessories
   - handrails
   - barrier free accessories (universal design)

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Install various types of locksets.
   - deadbolt
   - mortise
   - cylindrical
   - exit devices

2. Install various types of closers and operators.
   - recessed
   - jamb mounted
   - parallel arm
   - hold open

3. Install hardware.
   - stops
   - sweeps
   - push/pull plates
   - kick plates
   - viewers
   - thresholds
   - astragals
   - silencers
   - flush bolts
   - weather strip

4. Install various types of hinges.
   - butt
   - continuous

5. Install specialty accessories.
   - washroom accessories
   - toilet partitions
   - dispensers

CAR-1275 Stairs 1 (Common Stairs)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 15 and the National Carpenter Commonplace Curriculum units E.1.6 & E.2.6.

Description:

This course is designed to provide apprentices with the knowledge and skills required to plan, construct and install common stairs, stair components, railings and accessories.

Prerequisites:

CAR-0135, 0160, 1170, 1175

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the planning, construction and installation of common stairs

Required Knowledge and Skills:

FUNDAMENTALS OF STAIR CONSTRUCTION

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Identify **and describe** types of common stairs.
   - straight flight
   - L-shaped
   - U-shaped (open and closed newel)
   - winder
   - basement
   - exterior

- interior
- curved

3. **Define stair terminology.**
   - **total rise**
   - **total run**
   - **unit rise**
   - **unit run**
   - **headroom**
   - **flight**
   - **line of travel**
   - **effective depth**

4. Identify **and describe** stair components **and their characteristics**.
   - stringers
   - risers
   - treads
   - **skirts**
   - nosing
   - newels
   - balustrade
   - handrails
   - guardrails

CONSTRUCTION PLANNING AND PROCEDURES

5. **Calculate stair dimensions**.
   - total rise
   - total run
   - unit of rise
   - unit of run
   - headroom clearance
   - stairwell **opening**

6. **Describe the procedure for building stairs.**
   - **layout**
   - **secure stringer/hanger board**
   - **landings**
   - **treads**
   - **risers**
   - **handrails**
   - **winders**
   - **fasteners**
   - **adhesives**

7. **Describe the installation procedures for stairs**.
   - fasteners
   - adhesives

- NBC
- drop of stringer
- hangers
- attachment
- handrails
- guardrails
- landings
- line of flight
- line of travel
- storey pole
- materials
- cut of stair

8. Calculate common stairs dimensions.
   - material
   - total rise
   - total run
   - unit rise
   - unit run
   - tread stock
   - drop stringer
   - fasteners
   - adhesives
   - stringer length
   - elevation of landings
   - number of risers
   - number of treads
   - rough opening

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Construct and install common stairs.
   - material
   - layout
   - cut and assemble
   - risers
   - adhesives
   - treads
   - fasteners
   - winder
   - point of radiance
   - anchors

- shim
- scribe
- templates/jigs
- newels
- landings
- NBC
- safety
- prefab units
- line of travel
- rails

2. **Calculate stair dimensions.**

3. **Estimate materials.**

CAR-1276 Stairs 2 (Advanced Stairs)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 15 and the National Carpenter Commonplace Curriculum units E.1.6 & E.2.6.

Description:

This course is designed to provide apprentices with the knowledge and skills required to plan, construct and install various types of advanced stairs, stair components, railings and accessories.

Prerequisites:

CAR-1275

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of stair finish, balustrades and their installation
- demonstrate knowledge of geometric stair construction

Required Knowledge and Skills:

FINISH STAIRS

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Identify types of finish stairs.
   - open stairway
   - closed stairway
   - prefabricated units

3. Identify **and describe** components of finish stairs.

- **stringers**
  - **open**
  - **closed**
  - **housed**
- wall skirt
- mitred skirt
- nosing return
- **newels**
  - starting newel
  - landing newel
- balustrade
- gooseneck
- volute
- turn out
- level to rake (handrail)
- baluster
- fillet
- stringer and buttress cap
- riser
- tread
- mouldings

4. Calculate finish stairs material.
   - baluster spacing
   - balusters
   - tread stock
   - riser stock
   - skirt material
   - stringers
   - buttress
   - handrail
   - newell posts
   - fillets
   - mouldings

5. **Calculate finish stair dimensions.**
   - **code references**
   - **total rise**
   - **total run**
   - **unit of rise**
   - **unit of run**
   - **headroom clearance**
   - **stairwell opening**
   - **handrail layout**

6. Describe the **layout,** construction and installation of finish stairs.
   - total rise
   - total run

- unit rise
- unit run
- headroom
- stair ratio
- fasteners
- adhesives
- NBC
- drop of stringer
- hangers
- attachment
- handrail
- guardrails
- landings
- line of flight
- storey pole
- materials
- stair joinery
- assembly
- scribing
- jig
- template
- reveal

GEOMETRIC STAIRS

7. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

8. **Describe the types of** geometric stairs.
   - **spiral**
   - circular
   - elliptical
   - curved
   - prefab units

9. **Describe the** components of geometric stairs.
   - wall skirts
   - mitred skirts
   - gooseneck
   - volutes
   - turnouts
   - level to rake (handrail)

- balusters
- balustrade
- nosing return
- starting newel
- landing newel
- fillets
- string and buttress caps
- tread
- riser
- staved stringer
- laminated stringer
- handrail
- line of travel
- point of radiance
- rough framing

10. Calculate geometric stair dimensions.
    - inner tread width
    - outer tread width
    - circumference
    - length of handrails
    - length of stringers
    - total rise
    - unit rise
    - number of risers
    - number of treads
    - degree of turn
    - inner radius
    - outer radius
    - unit run at the line of travel
    - tread angle
    - rough opening dimensions

11. Describe the construction and installation of geometric stairs.
    - geometric layout
    - moulds
        - drums
        - staved
    - **laminate stringer**
    - stretch out line
    - reference lines
    - **treads**
    - **risers**
    - **staving**
    - **handrails**
    - **winders**
    - **fasteners**
    - **adhesives**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Calculate stair dimensions.

2. Estimate materials

3. Construct and install finished stairs.
   - material selection
   - threads
   - layout
   - risers
   - joinery
   - stringers
   - sequence
   - assembley
   - adhesives
   - fasteners
   - anchors
   - skirt boards
   - hand rails
   - balstrade
   - newels

CAR-1277 Stairs 3 (Concrete Stairs)

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 6 and the National Carpenter Commonplace Curriculum units E.1.6 & E.2.6.

Description:

This course is designed to provide apprentices with the knowledge and skills required to plan, construct and install concrete stairs.

Prerequisites:

CAR-1276

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of construction of stair forms and installation of concrete stairs

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. Describe various types of concrete stairs.
   - single flight open
   - single flight closed (1 or 2 sides)
   - winders
   - L-shaped landing
   - L-shaped landing
   - precase
   - circular

3. **Identify and describe components of concrete stairs.**
   - **stair parts**
   - **forming members**

4. **Calculate concrete stair dimensions.**
   - **total rise/total unit of rise**
   - **unit of run**
   - **landings**
   - **headroom**

5. Describe the construction of stair forms.
   - layout
   - support
   - ties
   - risers
   - bracers
   - soffitt
   - strong back
   - inverted stringer
   - multiple use
   - dismantling

6. **Explain the construction and installation of concrete stairs.**
   - **stringers**
   - **inverted stringer**
   - **form panels**
   - **bracing**
   - **reinforcing**
   - **falsework**

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. **Calculate stair dimensions.**

2. **Estimate materials.**

3. Layout stairs.
   - run
   - rise
   - soffitt
   - landing
   - effective depth

4. Construct and place forms.
   - soffitt form
   - side form
   - riser form
   - bracing
   - inverted stringer
   - strong back
   - shoring
   - dismantle form work and falsework
   - install miscellaneous inserts, anchors and templates
   - chamfer strips
   - reinforcing

CAR-1280 Cabinets

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 16 and the National Carpenter Commonplace curriculum units E.1.7 & E.2.7.

Description:

This course is designed to provide apprentices with the knowledge and skills required to construct and install cabinets, shelving and casework.

Prerequisites:

CAR-0100, 0105, 0135, 0140, 1145, 0160, 1170

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of cabinets, counter tops and shelving, their construction and installation

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. **Identify and describe types of cabinets.**
   - **built-ins**
   - **prefabricated**
   - **display units**
   - **shelving units**
   - **vanity**

3. Identify components of prefab/built-in cabinets, duropean cabinets, shelving units and casework.
   - ledger
   - base unit
   - upper unit
   - shelving unit
   - display case
   - closet organizers
   - door/drawer
   - kick space
   - gable
   - shelves
   - counter top
   - nosing
   - splash back
   - valance
   - stiles/rails
   - hardware
   - edge treatment
   - hanging brackets
   - mantle
   - 32 mm system

4. **Describe the construction and installation procedures for prefab/build-in cabinets, shelving units and casework.**
   - layout
   - materials
   - fasteners
   - anchors
   - adhesives
   - **assembly**
   - **components**
   - hardware
   - elevations
   - scribing
   - shimming
   - countertops **(laminated and preformed)**
   - openings
   - storey pole
   - joinery
   - panel products
   - size
   - levelling

5. Calculate for cabinets, shelving units and casework.
   - quantities
   - linear measure
   - shelf spacing

- gable widths
- balancing
- area
- percentage of waste

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Construct/install cabinets.
   - prefabricated
   - built-in
   - layout
   - elevations
   - material
   - fasteners
   - anchors
   - adhesives
   - matching
   - storey pole
   - components
   - hardware
   - scribing
   - fitting
   - levelling
   - shimming
   - openings
   - joinery
   - countertop
   - splash back

2. Construct/install shelving and casework.
   - prefabricated
   - built-in
   - layout
   - elevations
   - material
   - fasteners
   - anchors
   - adhesives
   - matching
   - storey pole
   - components
   - hardware

- scribing
- fitting
- levelling
- shimming
- joinery

CAR-1285 Interior Finish

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 17 and the National Carpenter Commonplace Curriculum units E.1.8 & E.2.8.

Description:

This course is designed to provide apprentices with the knowledge and skills required to select and install mouldings.

Prerequisites:

CAR-0100, 0105, 0120, 0135, 0140, 1145, 0160, 1170, 1175

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the procedures used to install mouldings

Required Knowledge and Skills:

1. **Describe relevant issues, practices and procedures relating to:**
   - **safety**
   - **materials**
   - **fasteners**
   - **tools**
   - **blueprint reading**
   - **building science**
   - **building codes**

2. **Identify and describe types of millwork.**
   - **mouldings**
   - **architectural**
   - **frames**

3. Describe common moulding **types and** profiles.
   - solid
   - sprung
   - casing

- baseboard
- apron
- stool
- chair rail
- picture rail
- plate rail
- bed
- crown
- scotia/cove
- half round
- batten
- carpet strip
- drywall moulding
- plastic moulding
- composite moulding
- **ceiling cornices**

4. Describe the use of mouldings.
   - decoration
   - joint covering and treatment

5. Describe methods of joining and installing mouldings.
   - mitre
   - butt
   - coped
   - scribed
   - compound mitred
   - lapped
   - finger joint
   - scarf
   - return mitre
   - reveal
   - fasteners
   - **finishing**
   - **touch-ups**

6. Calculate interior finish material.
   - quantity
   - percentage of waste
   - balancing
   - linear measure

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Install casings.
   - doors/windows
   - sequence
   - selection
   - reveal
   - stool
   - apron
   - stops
   - mullion
   - capitols
   - plinths
   - joints
   - fasteners
   - adhesives
   - muntin

2. Install architectural mouldings.
   - horizontal mouldings
   - baseboard
   - chair rail
   - picture rail
   - plate rail
   - bed moulding
   - crown moulding
   - solid
   - sprung
   - scotia/cove
   - half round
   - batten
   - joints
   - fasteners
   - adhesives
   - internal corner
   - external corner

3. **Install millwork.**
   - **shelving**
   - **mantels**
   - **architectural details**

CAR-1290 Renovation

Reference:

This material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 1 to 17.

Description:

Renovation now makes up a substantial sector of the construction industry. This course is included to reflect trends within the industry. The carpenter is likely to encounter combinations of building materials and techniques during renovation and skill is required in the successful integration of new methods and materials with old. This course raises problems and situations that might be encountered in existing buildings and introduces the apprentices to skills required when working with the customer. This course is designed to provide apprentices with the knowledge and skills required to describe the materials and methods used in renovation and the principles and practices involved in customer service.

Prerequisites:

CAR-0125,1155,1190,1195,1225,1234,1236,1240

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of renovation planning
- demonstrate knowledge of heat, air and moisture flow
- demonstrate knowledge of materials and methods used in below grade retrofit
- demonstrate knowledge of materials and methods used in exterior/interior retrofit
- demonstrate knowledge of materials and methods used in the construction of special structures
- demonstrate knowledge of job management and customer service techniques

Required Knowledge and Skills:

RENOVATIONS

1. Identify and explain documentation required for renovation work.
   - blueprints
   - permits
   - zoning regulations

- manufacturers' specifications
- contracts
- schedules (inspections, sub-trades)
- warranties
- workers compensation

2. Describe various types of renovations.
   - levels of retrofit

1. Explain the implications of building science principles and energy efficiency relating to retrofit.
   - heat flow
   - air flow
   - moisture flow
   - condensation
   - humidity
   - R-Value

2. Describe the process of house assessment.
   - homeowners needs
   - assessment procedure
   - renovation options
     - exterior retrofit
     - interior retrofit
     - material options
   - costing
   - benefits
   - energy saving

3. Describe procedures used for renovating below grade.
   - building science considerations
   - air sealing
   - interior retrofit
   - exterior retrofit

4. Describe considerations for renovating above grade.
   - re-siding
   - re-roofing
   - replacement of doors, windows, skylights
   - decks
   - insulation of walls, attics, roofs
   - air barriers
   - vapour barriers
   - ventilation
   - air sealing

5. Describe structural and aesthetic changes involved in renovation.
   - roof loads

- wall loads
- floor loads
- bearing capacity
- stresses
- kitchens/bathrooms
- recrooms/family rooms
- decks
- windows/doors
- hardware

CUSTOMER SERVICE

1. Describe the principles of customer service and its relevance to the industry.

2. Describe good practices for projecting a professional attitude.
   - respect the customer
   - appearance
   - workplace behavior

3. Describe effective communication.
   - first contact
   - sharing information

4. Describe methods of preventing property damage.
   - vehicles
   - cleanliness
   - use of tools and equipment
   - handling and installation of appliances
   - clean up

5. Describe good practices for dealing with customers.
   - calming customers
   - preventing problems
   - dealing with complaints
   - resolving problems

6. Describe effective strategies for dealing with difficult customers and high risk situations.

7. Describe cultural differences affecting work issues and communication and strategies for overcoming them.

Suggested Learning Activities:

Suggested learning activities are assigned to enhance the participant's ability to meet the objectives of the course. The learning activities outlined in this course are provided as suggestions only and may be substituted by the instructor for other relevant activities. Suggested learning activities include:

1. Classroom exercises as determined by the instructor.

Apprenticeship Training Standard Evaluation Form

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

- course division and organization
- relevancy of the content
- errors or omissions
- other suggestions for improvement and consideration

Overall comments are to be entered on this evaluation form and specific changes are to be entered directly on the document in the relevant area(s). When making proposed corrections(s) in the curriculum outline, please use red ink. When all feedback has been recorded, return this evaluation form along with the curriculum outline to the Apprenticeship Office noted at the bottom of the page.

(PLEASE PRINT)

Trade: Carpenter

Full Name: _____

Type of Position: (Trade Practitioner, Instructor, etc.): _____

Company: _____

Address: _____

Telephone: _____

Comments: (Use a separate sheet of paper if necessary)

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