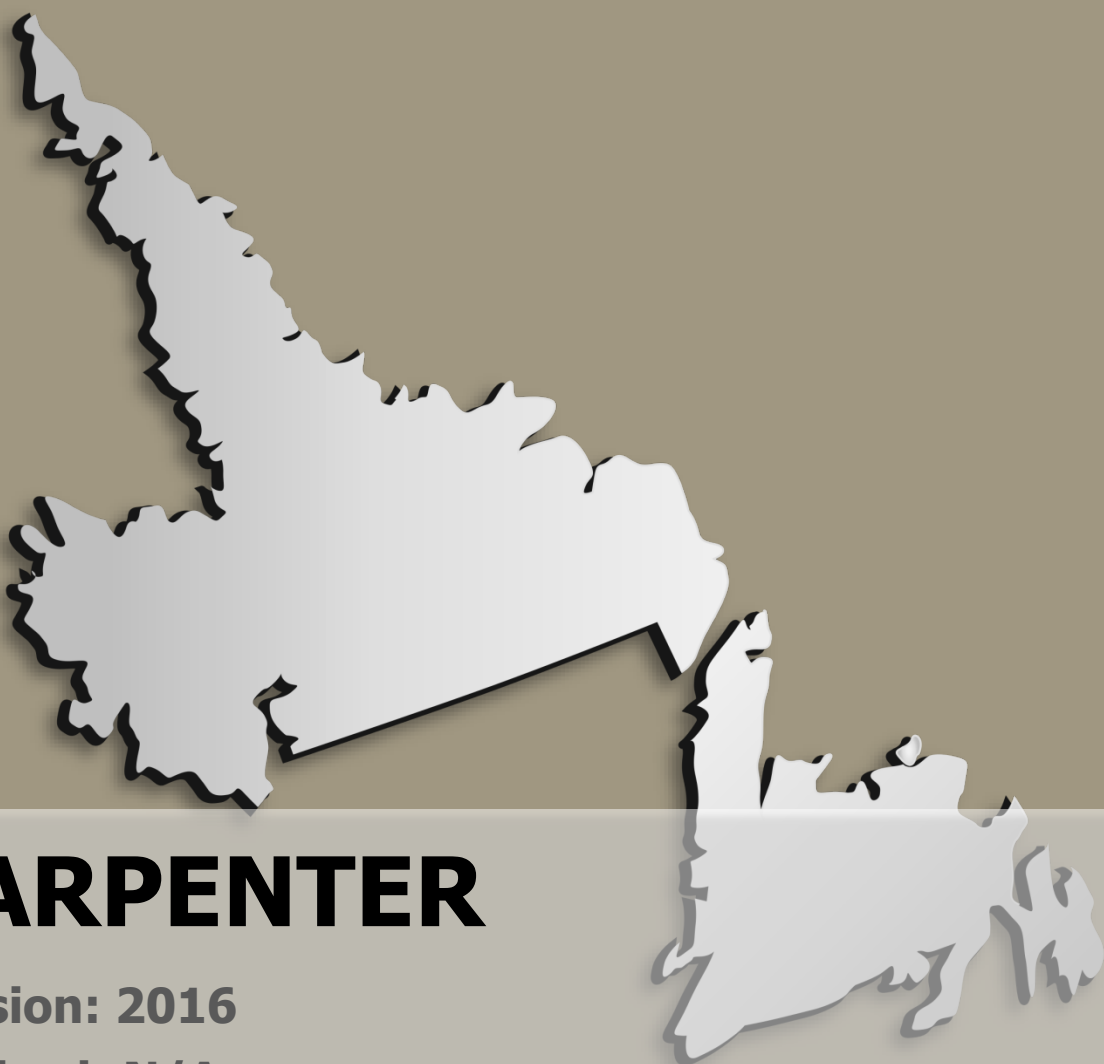


Atlantic Workforce Partnership

Curriculum Standard



CARPENTER

Version: 2016

Revised: N/A

Atlantic Apprenticeship



 COUNCIL OF
ATLANTIC PREMIERS
CONSEIL DES PREMIERS
MINISTRES DE L'ATLANTIQUE



Employment and
Social Development Canada

Emploi et
Développement social Canada

PLAN OF TRAINING

Atlantic Apprenticeship Curriculum Standard

Carpenter

APRIL 2016



**Government of Newfoundland and Labrador
Department of Advanced Education and Skills
Apprenticeship and Trades Certification Division**

Approved by:

A handwritten signature in blue ink, appearing to read "Dave Hill", written over a horizontal line.

Chairperson, Provincial Apprenticeship and Certification Board

Date: June 23, 2016

Atlantic Apprenticeship Curriculum Standard

Carpenter

Preface

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

This document contains all the technical training elements required to complete the Carpenter apprenticeship program and has been developed based on the 2013 National Occupational Analysis (NOA). The NOA and IPG can be found on the Red Seal website (www.red-seal.ca).

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

Level	Implementation Effective
Level 1	2016/2017
Level 2	2017/2018
Level 3	2018/2019
Level 4	2019/2020

*** The above implementation schedule identifies the training season where implementation is required to be complete in all Atlantic jurisdictions. Please **confirm** with Apprenticeship Staff in your jurisdiction for more specific implementation dates for your jurisdiction prior to commencing training.*

Granting of credit or permission to challenge level examinations for pre-employment or pre-apprenticeship training for the Carpenter trade will be based on the content outlined in this standard. Training providers must contact their provincial apprenticeship authority for more information on the process and requirements for determining eligibility for credit towards an apprenticeship program. Programs which have been deemed acceptable by the jurisdictional apprenticeship authority will be identified in transfer credit matrix developed through the Atlantic Apprenticeship Harmonization Project.

Acknowledgements

The development of the Atlantic Apprenticeship Curriculum Standard (AACS) is an initiative of the Atlantic Apprenticeship Council's Atlantic Apprenticeship Harmonization Project (AAHP) through the Atlantic Workforce Partnership and Employment and Social Development Canada.

The Atlantic Apprenticeship Council wishes to acknowledge the contributions of the following industry and instructional representatives on the Atlantic Trade Advisory Committee (ATAC) who participated in the development of this document in January 2015.

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Advisory committees, industry representatives, instructors and apprenticeship staff provided valuable input to the development of this document. Without their dedication to quality apprenticeship training, this document could not have been produced.

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User Guide

Atlantic Apprenticeship Curriculum Standards (AACS) are developed based on National Occupational Analyses (NOA), Interprovincial Program Guides (IPG) (if available) and extensive industry consultation. This document represents the minimum content to be delivered as part of the harmonized Atlantic program for the Carpenter trade.

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

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

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

Structure

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

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

Summative evaluation will be through a multiple-choice Level Examination administered through the jurisdictional Apprenticeship Authority.

User Guide *(continued)*

The 2013 National Occupational Analysis References (NOA) to AACS Comparison chart outlines the relation between each NOA sub-task and the AACS units. NOA References have also been detailed in each unit to highlight the direct link between the unit and relevant sub-tasks in the NOA.

In the Level Structure section, the document identifies suggested hours in order to provide an indication of the time it should take to cover the material in the unit and is provided as a guide only. Adjustments to the suggested hours for each unit may be required to account for rate of apprentice learning, statutory holidays, storm days, registration and examinations. These suggested hours detailed for each unit will represent both theory and practical training (if relevant) and for consistency will be based on a standard of 30 hours per week of training. The true length of time required to deliver an outcome successfully will depend upon the learning activities and teaching methods used.

There are two types of objectives found in the AACS document: theoretical and practical.

The theoretical objectives represent the material that is to be covered during the technical training in order to convey the required knowledge to the apprentice.

The practical objectives represent the tasks or skills that have been deemed by the Atlantic Trade Advisory Committee as critical for the apprentices to receive exposure to while attending technical training. For example, exposure could be done through instructor demonstration or individual or group performance of the skill or task. Training providers are encouraged to use practical demonstration and opportunities for hands-on learning whenever possible. Practical objectives are not intended to replace the on-the-job training component of the apprentice's program or to mirror or replace the logbook skills that are to be taught and evaluated in the workplace.

Detailed content for each objective has not been developed. Where detail is required for clarity, content has been provided.

Glossary of Terms

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

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

Glossary of Terms (*continued*)

SERVICE	<p>Routine inspection and replacement of worn or deteriorating parts.</p> <p>An act or business function provided to a customer in the course of an individual's profession (e.g., haircut).</p>
TECHNIQUE	<p>Within a procedure, the manner in which technical skills are applied.</p>
TEST	<p>v. To subject to a procedure that ascertains effectiveness, value, proper function or other quality.</p> <p>n. A way of examining something to determine its characteristics or properties, or to determine whether or not it is working correctly.</p>

Essential Skills Profiles

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

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

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

Essential Skills profiles can be found on the Employment and Social Development Canada (ESDC) website at www.esdc.gc.ca/eng/jobs/les/profiles/index.shtml

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

Profile Chart

COMMON OCCUPATIONAL SKILLS			
CAR-100 Safety Awareness	CAR-105 Tools and Equipment	CAR-110 Introduction to Lifting, Rigging and Hoisting	CAR-115 Fasteners, Connectors and Adhesives
CAR-140 Basic Site Layout	CAR-145 Wood and Wood Products	CAR-150 Non-Wood Products	CAR-200 Building Science Principles
CAR-205 Building Envelope	CAR-210 Advanced Site Layout	CAR-300 Building Science Practices	CAR-445 Project Planning
PLANNING AND LAYOUT			
CAR-120 Communication and Trade Documentation	CAR-125 Introduction to Project Drawings and Specifications	CAR-130 Temporary Access Equipment and Structures	CAR-445 Project Planning
CONCRETE			
CAR-135 Hoarding	CAR-155 Concrete	CAR-215 Footings and Slab-On- Grade Forms	CAR-600 Wall Forms
CAR-400 Stair Forms	CAR-415 Pre-Cast Concrete	CAR-420 Suspended Slab and Beam Forms	CAR-615 Column and Vertical Forms
CAR-610 Excavation, Shoring and Underpinning			
FRAMING			
CAR-160 Beams and Supports	CAR-165 Floor Layout and Framing	CAR-170 Exterior Wall and Partition Layout and Framing	CAR-175 Introduction to Framing Systems
CAR-225 Deck Layout and Framing	CAR-230 Introduction to Roof and Ceiling Layout and Framing	CAR-235 Gable Roof Layout and Framing	CAR-250 Preserved Wood Foundations

Profile Chart *(continued)*

FRAMING(CONTINUED)			
CAR-305 Hip Roof Layout and Framing	CAR-310 Equal Slope Intersecting Roof Layout and Framing	CAR-425 Special Roof Layout and Framing	CAR-435 Unequal Slope Roof Layout and Framing
EXTERIOR FINISH			
CAR-240 Roof Coverings	CAR-315 Fixtures and Hardware	CAR-605 Exterior Windows	CAR-325 Exterior Doors
CAR-330 Exterior Wall Covering Systems			
INTERIOR FINISH			
CAR-245 Straight Stairs	CAR-315 Fixtures and Hardware	CAR-620 Interior Doors and Windows	CAR-340 Interior Trim
CAR-345 Cabinets, Countertops and Built-in Units	CAR-350 Flooring and Floorcoverings	CAR-405 Interior Wall Systems	CAR-410 Ceilings
CAR-625 Finish and Geometric Stairs	CAR-630 Panels, Tiles and Solid Wood Finishes Installation		
RENOVATION			
CAR-450 Renovation			

Level Structure

Level 1 – 8 Weeks

Unit Code	Unit Title	Suggested Hours	Page Number
CAR-100	Safety Awareness	12	21
CAR-105	Tools and Equipment	12	24
CAR-145	Wood and Wood Products	9	26
CAR-150	Non-Wood Products	6	28
CAR-115	Fasteners, Connectors and Adhesives	6	30
CAR-130	Temporary Access Equipment and Structures	9	32
CAR-135	Hoarding	3	35
CAR-110	Introduction to Lifting, Rigging and Hoisting	9	37
CAR-140	Basic Site Layout	27	40
CAR-155	Concrete	12	42
CAR-215	Footings and Slab-On-Grade Forms	24	45
CAR-600	Wall Forms	24	47
CAR-175	Introduction to Framing Systems	6	49
CAR-160	Beams and Supports	18	51
CAR-165	Floor Layout and Framing	24	53
CAR-225	Deck Layout and Framing	9	55
CAR-120	Communication and Trade Documentation	3	57
CAR-125	Introduction to Project Drawings and Specifications	27	59

Level 2 – 8 Weeks

Unit Code	Unit Title	Suggested Hours	Page Number
CAR-200	Building Science Principles	9	63
CAR-205	Building Envelope	6	65
CAR-170	Exterior Wall and Partition Layout and Framing	36	67
CAR-250	Preserved Wood Foundations	3	69
CAR-330	Exterior Wall Covering Systems	36	71
CAR-230	Introduction to Roof and Ceiling Layout and Framing	6	73
CAR-235	Gable Roof Layout and Framing	30	75
CAR-240	Roof Coverings	24	77
CAR-605	Exterior Windows	18	79
CAR-325	Exterior Doors	18	81
CAR-245	Straight Stairs	30	83
CAR-210	Advanced Site Layout	24	85

Level Structure (continued)

Level 3 – 7 Weeks

Unit Code	Unit Title	Suggested Hours	Page Number
CAR-400	Stair Forms	21	88
CAR-610	Excavation, Shoring and Underpinning	3	90
CAR-415	Pre-Cast Concrete	6	92
CAR-420	Suspended Slab and Beam Forms	21	94
CAR-615	Column and Vertical Forms	21	97
CAR-305	Hip Roof Layout and Framing	30	99
CAR-310	Equal Slope Intersecting Roof Layout and Framing	30	101
CAR-405	Interior Wall Systems	15	103
CAR-410	Ceilings	15	106
CAR-620	Interior Doors and Windows	15	108
CAR-340	Interior Trim	18	110
CAR-315	Fixtures and Hardware	3	112
CAR-345	Cabinets, Countertops and Built-in Units	12	114

Level 4 – 7 Weeks

Unit Code	Unit Title	Suggested Hours	Page Number
CAR-445	Project Planning	27	117
CAR-300	Building Science Practices	15	119
CAR-425	Special Roof Layout and Framing	24	121
CAR-435	Unequal Slope Roof Layout and Framing	33	123
CAR-625	Finish and Geometric Stairs	45	125
CAR-350	Flooring and Floorcoverings	15	128
CAR-630	Panels, Tiles and Solid Wood Finishes Installation	6	131
CAR-450	Renovation	15	133
CAR-635	Program Review	30	136

2013 NOA Sub-task to AACS Unit Comparison

NOA Sub-task		AACS Unit	
Task 1 – Uses and maintains tools and equipment.			
1.01	Maintains hand, power and pneumatic tools.	CAR-105	Tools and Equipment
1.02	Maintains stationary tools.	CAR-105	Tools and Equipment
1.03	Uses powder-actuated tools.	CAR-105	Tools and Equipment
1.04	Uses lifting, rigging and hoisting equipment.	CAR-110	Introduction to Lifting, Rigging and Hoisting
1.05	Uses layout instruments.	CAR-105	Tools and Equipment
		CAR-140	Basic Site Layout
		CAR-210	Advanced Site Layout
1.06	Uses tack welding equipment. (NOT COMMON CORE)		
1.07	Uses torch cutting equipment. (NOT COMMON CORE)		
Task 2 – Performs safety related activities.			
2.01	Uses personal protective equipment (PPE) and safety equipment.	CAR-100	Safety Awareness
2.02	Maintains safe work environment.	CAR-100	Safety Awareness
		CAR-135	Hoarding
		CAR-145	Wood and Wood Products
Task 3 – Uses building materials.			
3.01	Installs fasteners, adhesives and connectors.	CAR-115	Fasteners, Connectors and Adhesives
3.02	Installs membranes and sealants.	CAR-150	Non-Wood Products
		CAR-200	Building Science Principles
		CAR-205	Building Envelope
		CAR-300	Building Science Practices
3.03	Installs foundation protection.	CAR-150	Non-Wood Products
		CAR-200	Building Science Principles
		CAR-300	Building Science Practices
3.04	Installs insulating materials	CAR-150	Non-Wood Products
		CAR-200	Building Science Principles
		CAR-300	Building Science Practices
Task 4 – Builds and uses temporary access structures.			
4.01	Uses stationary access equipment.	CAR-130	Temporary Access Equipment and Structures
4.02	Uses mobile access equipment.	CAR-130	Temporary Access Equipment and Structures
4.03	Erects/dismantles scaffolding.	CAR-130	Temporary Access Equipment and Structures
4.04	Modifies specialized scaffolding.	CAR-130	Temporary Access Equipment and Structures

NOA Sub-task		AACS Unit	
Task 5 – Interprets documentation.			
5.01	Interprets project drawing.	CAR-120	Communication and Trade Documentation
		CAR-125	Introduction to Projects Drawings and Specifications Throughout applicable units
5.02	Interprets specifications.	CAR-120	Communication and Trade Documentation
		CAR-125	Introduction to Projects Drawings and Specifications Throughout applicable units.
5.03	Interprets safety documentation.	CAR-100	Safety Awareness
		CAR-120	Communication and Trade Documentation
5.04	Interprets workplace documentation.	CAR-120	Communication and Trade Documentation Throughout applicable units.
Task 6 – Organizes work.			
6.01	Schedules work sequence.	CAR-445	Project Planning
6.02	Performs site preparation.	CAR-210	Advanced Site Layout
		CAR-445	Project Planning
6.03	Performs quantity take-off.	CAR-125	Introduction to Projects Drawings and Specifications
		CAR-445	Project Planning
6.04	Organizes materials.	CAR-145	Wood and Wood Products
		CAR-445	Project Planning
Task 7 – Performs layout.			
7.01	Performs site layout.	CAR-140	Basic Site Layout
		CAR-210	Advanced Site Layout
7.02	Lays out concrete formwork.	CAR-215	Footings and Slab-on-Grade Forms
7.03	Lays out floor systems.	CAR-160	Beams and Supports
		CAR-165	Floor Layout and Framing
7.04	Lays out deck systems.	CAR-225	Deck Layout and Framing
7.05	Lays out wall systems.	CAR-170	Exterior Wall and Partition Layout and Framing
7.06	Lays out ceiling systems.	CAR-160	Beams and Supports
		CAR-230	Introduction to Roof and Ceiling Layout and Framing
7.07	Lays out roof systems.	CAR-230	Introduction to Roof and Ceiling Layout and Framing
		CAR-235	Gable Roof Layout and Framing
		CAR-305	Hip Roof Layout and Framing
		CAR-310	Equal Slope Intersecting Roof Layout and Framing
		CAR-425	Special Roof Layout and Framing

NOA Sub-task		AACCS Unit	
		CAR-435	Unequal Slope Roof Layout and Framing
Task 8 – Constructs formwork.			
8.01	Erects excavation shoring and underpinning.	CAR-420	Suspended Slab and Beam Forms
		CAR-610	Excavation, Shoring and Underpinning
8.02	Erects concrete falsework.	CAR-420	Suspended Slab and Beam Forms
8.03	Constructs footing forms.	CAR-215	Footings and Slab-on-Grade Forms
8.04	Constructs wall and grade beam formwork.	CAR-600	Wall Forms
8.05	Constructs slab-on-grade formwork.	CAR-215	Footings and Slab-on-Grade Forms
		CAR-420	Suspended Slab and Beam Forms
8.06	Constructs column formwork.	CAR-615	Column and Vertical Forms
8.07	Constructs stair formwork.	CAR-400	Stair Forms
8.08	Installs embedded steel.	CAR-215	Footings and Slab-on-Grade Forms
		CAR-615	Column and Vertical Forms
		CAR-400	Stair Forms
		CAR-420	Suspended Slab and Beam Forms
8.09	Dismantles formwork.	CAR-215	Footings and Slab-on-Grade Forms
		CAR-600	Wall Forms
		CAR-615	Column and Vertical Forms
		CAR-400	Stair Forms
		CAR-420	Suspended Slab and Beam Forms
Task 9 – Installs concrete, cement-based and epoxy products.			
9.01	Places concrete.	CAR-155	Concrete
9.02	Facilitates the curing of concrete.	CAR-155	Concrete
9.03	Performs basic concrete finishing.	CAR-155	Concrete
9.04	Installs pre-cast components.	CAR-415	Pre-Cast Concrete
9.05	Installs grout.	CAR-415	Pre-Cast Concrete
Task 10 – Constructs floor systems.			
10.01	Installs engineered floor systems.	CAR-145	Wood and Wood Products
		CAR-150	Non-Wood Products
		CAR-160	Beams and Supports
10.02	Constructs dimensional lumber floor framing.	CAR-145	Wood and Wood Products
		CAR-160	Beams and Supports
		CAR-250	Preserved Wood Foundations
Task 11 – Constructs deck systems.			
11.01	Constructs decks.	CAR-145	Wood and Wood Products
		CAR-150	Non-Wood Products
		CAR-225	Deck Layout and Framing
11.02	Installs deck components.	CAR-145	Wood and Wood Products
		CAR-150	Non-Wood Products
		CAR-225	Deck Layout and Framing

NOA Sub-task		AACCS Unit	
Task 12 – Constructs wall systems.			
12.01	Installs engineered wall systems.	CAR-145	Wood and Wood Products
		CAR-150	Non-Wood Products
		CAR-160	Beams and Supports
		CAR-175	Introduction to Framing Systems
		CAR-170	Exterior Wall and Partition Layout and Framing
12.02	Constructs dimensional lumber wall framing.	CAR-145	Wood and Wood Products
		CAR-160	Beams and Supports
		CAR-175	Introduction to Framing Systems
		CAR-170	Exterior Wall and Partition Layout and Framing
		CAR-250	Preserved Wood Foundations
Task 13 - Constructs roof and ceiling systems.			
13.01	Installs engineered trusses.	CAR-230	Introduction to Roof and Ceiling Layout and Framing
		CAR-235	Gable Roof Layout and Framing
		CAR-305	Hip Roof Layout and Framing
		CAR-310	Equal Slope Intersecting Roof Layout and Framing
		CAR-425	Special Roof Layout and Framing
		CAR-435	Unequal Slope Roof Layout and Framing
13.02	Constructs roof and ceiling framing.	CAR-145	Wood and Wood Products
		CAR-230	Introduction to Roof and Ceiling Layout and Framing
		CAR-235	Gable Roof Layout and Framing
		CAR-305	Hip Roof Layout and Framing
		CAR-310	Equal Slope Intersecting Roof Layout and Framing
		CAR-425	Special Roof Layout and Framing
		CAR-435	Unequal Slope Roof Layout and Framing
Task 14 - Installs exterior doors and windows.			
14.01	Installs exterior jambs/frames.	CAR-605	Exterior Windows
		CAR-325	Exterior Doors
14.02	Installs exterior doors.	CAR-325	Exterior Doors
14.03	Installs specialty exterior doors.	CAR-325	Exterior Doors
14.04	Installs exterior windows.	CAR-605	Exterior Windows
14.05	Installs exterior door and window hardware.	CAR-605	Exterior Windows
		CAR-325	Exterior Doors
Task 15 - Installs roofing.			
15.01	Installs roofing components.	CAR-150	Non-Wood Products
		CAR-240	Roof Coverings
15.02	Installs roofing coverings.	CAR-150	Non-Wood Products

NOA Sub-task		AACCS Unit	
		CAR-240	Roof Coverings
Task 16 - Installs exterior finishes.			
16.01	Installs exterior wall components.	CAR-145	Wood and Wood Products
		CAR-150	Non-Wood Products
		CAR-330	Exterior Wall Covering Systems
16.02	Installs exterior wall coverings.	CAR-330	Exterior Wall Covering Systems
Task 17 - Applies wall and ceiling finishes.			
17.01	Installs wallboard.	CAR-150	Non-Wood Products
		CAR-405	Interior Wall Systems
		CAR-410	Ceilings
17.02	Installs wall compound.	CAR-150	Non-Wood Products
		CAR-405	Interior Wall Systems
		CAR-410	Ceilings
17.03	Installs panels, tiles and solid wood finishes.	CAR-145	Wood and Wood Products
		CAR-150	Non-Wood Products
		CAR-410	Ceilings
		CAR-630	Panels, Tiles and Solid Wood Finishes
17.04	Installs suspended ceilings.	CAR-150	Non-Wood Products
		CAR-410	Ceilings
17.05	Installs demountable wall systems.	CAR-150	Non-Wood Products
		CAR-405	Interior Wall Systems
		CAR-340	Interior Trim
Task 18 - Installs flooring.			
18.01	Installs underlayment.	CAR-350	Flooring and Floorcoverings
18.02	Installs floor coverings.	CAR-350	Flooring and Floorcoverings
18.03	Installs access flooring.	CAR-150	Non-Wood Products
		CAR-350	Flooring and Floorcoverings
Task 19 - Installs interior doors and windows.			
19.01	Installs interior jambs/frames.	CAR-620	Interior Doors and Windows
19.02	Installs interior doors.	CAR-620	Interior Doors and Windows
19.03	Installs interior windows.	CAR-620	Interior Doors and Windows
19.04	Installs interior door and window hardware.	CAR-620	Interior Doors and Windows
Task 20 - Constructs and installs finish components and stairs.			
20.01	Fabricates finish components.	CAR-145	Wood and Wood Products
		CAR-345	Cabinets, Countertops and Built-in Units
		CAR-340	Interior Trim
		CAR-625	Finish and Geometric Stairs
20.02	Installs finish components and accessories.	CAR-315	Fixtures and Hardware
		CAR-340	Interior Trim
		CAR-625	Finish and Geometric Stairs
		CAR-345	Cabinets, Countertops and Built-in Units
		CAR-625	Finish and Geometric Stairs
20.03	Constructs stairs.	CAR-145	Wood and Wood Products

NOA Sub-task		AACS Unit	
		CAR-245	Straight Stairs
		CAR-625	Finish and Geometric Stairs
Task 21 – Performs renovation-specific support activities.			
21.01	Removes existing material.	CAR-450	Renovation
21.02	Protects structure during renovations.	CAR-450	Renovation
Task 22 – Performs renovation-specific construction activities.			
22.01	Joins new to existing construction.	CAR-450	Renovation
22.02	Changes existing structure during renovations.	CAR-450	Renovation

Level 1

Unit Code	Title	Hours	Page
CAR-100	Safety Awareness	12	21
CAR-105	Tools and Equipment	12	24
CAR-145	Wood and Wood Products	9	26
CAR-150	Non-Wood Products	6	28
CAR-115	Fasteners, Connectors and Adhesives	6	30
CAR-130	Temporary Access Equipment and Structures	9	32
CAR-135	Hoarding	3	35
CAR-110	Introduction to Lifting, Rigging and Hoisting	9	37
CAR-140	Basic Site Layout	27	40
CAR-155	Concrete	12	42
CAR-215	Footings and Slab-On-Grade Forms	24	45
CAR-600	Wall Forms	24	47
CAR-175	Introduction to Framing Systems	6	49
CAR-160	Beams and Supports	18	51
CAR-165	Floor Layout and Framing	24	53
CAR-225	Deck Layout and Framing	9	55
CAR-120	Communication and Trade Documentation	3	57
CAR-125	Introduction to Project Drawings and Specifications	27	59

Learning Outcomes:

- Demonstrate knowledge of personal protective equipment (PPE) and safety equipment, their applications, maintenance and procedures for use.
- Demonstrate knowledge of regulatory requirements pertaining to safety.
- Demonstrate knowledge of safe work practices.

2013 National Occupational Analysis:

- 2.01 Uses personal protective equipment (PPE) and safety equipment.
- 2.02 Maintains safe work environment.
- 5.03 Interprets safety documentation.

Suggested Hours:

12 Hours

Objectives and Content:Theoretical Objectives

1. Define terminology associated with workplace hazards and safe work practices.
2. Identify workplace hazards and describe safe work practices and equipment.
 - i) personal
 - lifting
 - fall protection
 - ii) workplace
 - electrical
 - utilities
 - underground
 - overhead
 - confined space (awareness of)
 - fall protection
 - fire
 - trenching and excavation
 - product off gassing
 - air quality

- lock out/tag out
 - access and egress
 - iii) environmental
 - site conditions
 - runoff/silting
 - below grade soil
 - radon gases
 - asbestos
 - lead
 - mercury
 - animal excrements
 - pests
 - ticks
 - molds and mildew
 - WHMIS regulated hazardous materials
3. Interpret regulations and standards pertaining to workplace hazards and safe work practices.
- i) federal
 - Workplace Hazardous Material Information System (WHMIS)
 - Canadian Standards Association (CSA)
 - ii) provincial/territorial
 - Occupational Health and Safety (OH&S)
 - First Aid
 - iii) municipal
 - iv) workplace
 - workplace orientation
 - hazard assessment
4. Identify types of PPE and describe their applications and procedures for use.
- i) clothing
 - ii) equipment
 - iii) products
 - sunscreen
 - sanitizers
5. Identify types of safety equipment and describe their applications and procedures for use.

6. Describe the procedures used to care for, maintain and store PPE and safety equipment.
7. Describe the procedures used to lock out and tag out equipment.
8. Describe the procedures used to store, transport and dispose of materials.
9. Describe the procedures used to maintain a safe work environment and to remediate potential dangers related to workplace hazards.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of hand, powered, gas and pneumatic tools, their applications, maintenance and procedures for use.
- Demonstrate knowledge of stationary tools, their applications, maintenance and procedures for use.
- Demonstrate knowledge of powder-actuated tools and their applications, maintenance and procedures for use.
- Demonstrate knowledge of measuring and layout tools and equipment, their applications, maintenance and procedures for use.
- Demonstrate knowledge of material handling their applications, maintenance and procedures for use.

2013 National Occupational Analysis:

- 1.01 Maintains hand, power and pneumatic tools.
- 1.02 Maintains stationary tools.
- 1.03 Uses powder-actuated tools.
- 1.05 Uses layout instruments.

Suggested Hours:

12 Hours

Objectives and Content:Theoretical Objectives

1. Define terminology associated with tools and equipment.
2. Identify hazards and describe safe work practices pertaining to tools and equipment.
3. Interpret regulations and specifications pertaining to tools and equipment.
 - i) certification
 - ii) training

4. Identify types of hand, powered, gas and pneumatic tools and accessories, and describe their applications and procedures for use.
5. Identify types of stationary tools and accessories, and describe their applications and procedures for use.
6. Identify types of powder-actuated tools, and describe their applications and procedures for use.
7. Identify types of measuring and layout tools and equipment, and describe their applications and procedures for use.
8. Identify types of material handling, and describe their applications and procedures for use.
 - i) aerial work platforms
 - ii) forklifts
 - iii) telehandlers
 - iv) skidsteers
9. Identify the factors to consider when selecting tools and equipment.
 - i) safety and training requirements
 - ii) condition of tool or equipment (damaged, worn, defective)
10. Describe the procedures used to inspect, maintain and store hand tools, powered, gas and pneumatic tools and equipment.
11. Describe the procedures used to inspect and maintain stationary tools.
12. Describe the procedures used to inspect, maintain and store powder-actuated tools.
13. Describe the procedures used to inspect, maintain and store measuring and layout tools and equipment.
14. Describe the procedures used to inspect, maintain and store material handling equipment.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of wood and wood products, their characteristics and applications.
- Demonstrate knowledge of the procedures used to handle and store wood and wood products.

2013 National Occupational Analysis:

- 2.02 Maintains safe work environment
- 6.04 Organizes materials.
- 10.01 Installs engineered floor systems.
- 10.02 Constructs dimensional lumber floor framing.
- 11.01 Constructs decks.
- 11.02 Installs deck components.
- 12.01 Installs engineered wall systems.
- 12.02 Constructs dimensional lumber wall framing.
- 13.02 Constructs roof and ceiling framing.
- 16.01 Installs exterior wall components.
- 17.03 Installs panels, tiles and solid wood finishes.
- 20.01 Fabricates finish components.
- 20.03 Constructs stairs.

Suggested Hours:

9 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with wood and wood products.
2. Identify hazards and describe safe work practices pertaining to handling wood and wood products.
3. Interpret codes and regulations pertaining to wood and wood products.

4. Interpret information pertaining to wood and wood products found on drawings and specifications.
5. Identify tools and equipment used with wood and wood products, and describe their applications and procedures for use.
6. Identify types of wood and describe their characteristics and applications.
 - i) hardwoods
 - ii) softwoods
7. Identify types of wood products and describe their characteristics and applications.
 - i) lumber
 - ii) panels
 - iii) engineered products
 - lumber
 - structural insulated panels (SIP)
8. Identify wood defects.
9. Describe wood processing.
 - i) sawing
 - ii) seasoning/drying
 - iii) dressing/planing
 - iv) grading
 - v) treating
10. Describe the procedures used to select, handle and store wood products.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of non-wood products, their characteristics and applications.
- Demonstrate knowledge of the procedures used to handle and store non-wood products.

2013 National Occupational Analysis:

- 3.02 Installs membranes and sealants.
- 3.03 Installs foundation protection.
- 3.04 Installs insulating materials
- 10.01 Installs engineered floor systems.
- 11.01 Constructs decks.
- 11.02 Installs deck components.
- 12.01 Installs engineered wall systems.
- 15.01 Installs roofing components.
- 15.02 Installs roof coverings.
- 16.01 Installs exterior wall components.
- 16.02 Installs exterior wall coverings.
- 17.01 Installs wallboard.
- 17.02 Applies wall compound.
- 17.03 Installs panels, tiles and solid wood finishes.
- 17.04 Installs suspended ceilings
- 17.05 Installs demountable wall systems.
- 18.03 Installs access flooring.

Suggested Hours:

6 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with non-wood products.

2. Identify hazards and describe safe work practices pertaining to handling non-wood products.
3. Interpret codes and regulations pertaining to non-wood products.
4. Interpret information pertaining to non-wood products found on drawings and specifications.
5. Identify tools and equipment used with non-wood products, and describe their applications and procedures for use.
6. Identify types of non-wood products and describe their characteristics and applications.
 - i) composite
 - ii) metal
 - iii) plastic
 - iv) glass
 - v) foam
 - vi) ceramic
 - vii) cementitious board
 - viii) masonry
 - ix) gypsum
7. Describe the procedures used to select, handle and store non-wood products.

Practical Objectives

None

Learning Outcomes:

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

2013 National Occupational Analysis:

3.01 Installs fasteners, adhesives and connectors.

Suggested Hours:

6 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with fasteners, connectors and adhesives.
2. Identify hazards and describe safe work practices pertaining to fasteners, connectors and adhesives.
3. Interpret codes and specifications pertaining to fasteners, connectors and adhesives.
4. Interpret information pertaining to fasteners, connectors and adhesives found on drawings and specifications.
5. Identify tools and equipment used with fasteners, connectors and adhesives, and describe their applications and procedures for use.
6. Identify types and sizes of fasteners and connectors, and describe their characteristics and applications.
 - i) Fasteners
 - threaded
 - non-threaded
 - ii) anchors
 - chemical

- mechanical
 - cast-in-place
- iii) hangers/tie downs
7. Identify the factors to consider when selecting fasteners and connectors.
- i) specifications
 - ii) type and condition of base material
 - iii) environmental conditions
 - iv) application
8. Describe the procedures used to install and remove fasteners and connectors.
9. Identify types of adhesives and describe their characteristics and applications.
10. Identify the factors to consider when selecting adhesives.
- i) specifications
 - ii) type and condition of base material
 - iii) environmental conditions
 - iv) application
11. Describe the procedures used to apply and remove adhesives.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of temporary access equipment and structures, their applications and procedures for use.
- Demonstrate knowledge of the procedures to construct, install secure and maintain stationary access equipment.
- Demonstrate knowledge of the procedures to set up, operate and maintain mobile access equipment.
- Demonstrate knowledge of the procedures to erect, dismantle and modify scaffolding.

2013 National Occupational Analysis:

- 4.01 Uses stationary access equipment.
- 4.02 Uses mobile access equipment.
- 4.03 Erects/dismantles scaffolding.
- 4.04 Modifies specialized scaffolding.

Suggested Hours:

9 Hours

Objectives and Content:*Theoretical Objectives*

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

5. Identify types of temporary access equipment and structures and their components, and describe their applications.
 - i) stationary access equipment
 - ladders
 - ramps
 - temporary stairs
 - ii) mobile access equipment
 - elevating work platforms
 - telescoping booms
 - articulated booms
 - iii) scaffolding
 - wood
 - metal
 - welded frame
 - tube-and-clamp
 - systems
 - iv) specialty access equipment
 - swing stages
 - boatswain's chairs (bosun's chairs)
 - pumpjack
6. Identify tools and materials used with temporary access equipment and structures.
7. Identify the considerations for installing and securing temporary access structures.
 - i) code and regulatory requirements
 - ii) site conditions
 - iii) manufacturers' specifications and instructions
8. Describe the procedures used to install and secure stationary access equipment.
9. Describe the procedures used to inspect, maintain and store stationary access equipment.
10. Describe the procedures used to set-up and operate mobile access equipment.
11. Describe the procedures used to inspect, maintain and store mobile access equipment.

12. Describe the procedures used to erect, secure and dismantle scaffolding.
13. Identify the considerations when modifying existing scaffold structures.
 - i) manufacturers' specifications
 - ii) jurisdictional regulations
 - iii) location and type of support systems
14. Describe the procedures used to modify existing scaffold structures.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of hoarding, its purpose and applications.
- Demonstrate knowledge of the procedures used to construct and dismantle hoarding.

2013 National Occupational Analysis:

2.02 Maintains safe work environment.

Suggested Hours:

3 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with hoarding.
2. Identify hazards and describe safe work practices pertaining to hoarding.
3. Interpret codes, regulations and specifications pertaining to hoarding.
 - i) lighting
 - ii) ventilation
 - iii) temperature
 - iv) moisture
4. Identify types of hoarding and describe their purpose and applications.
 - i) environmental
 - ii) containment
5. Identify equipment and materials used to construct hoarding, and describe their characteristics and applications.
6. Identify materials/fasteners, adhesives and connectors used to construct hoarding, and describe their characteristics and applications.

7. Describe the procedures used to construct and dismantle hoarding.

Practical Objectives

None

Learning Outcomes:

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

2013 National Occupational Analysis:

1.04 Uses lifting, rigging and hoisting equipment.

Suggested Hours:

9 Hours

Objectives and Content:

Theoretical Objectives

1. Define terminology associated with lifting, rigging and hoisting.
2. Identify hazards and describe safe work practices pertaining to lifting, rigging and hoisting.
3. Interpret codes and regulations pertaining to lifting, rigging and hoisting.
4. Interpret information pertaining to lifting, rigging and hoisting found on drawings and specifications.
5. Identify types of lifting equipment and accessories, and describe their applications, limitations and procedures for use.
6. Identify types of rigging equipment and accessories, and describe their applications, limitations and procedures for use.
7. Identify types of hoisting equipment and accessories, and describe their applications, limitations and procedures for use.

8. Identify types of knots, hitches and bends and describe their applications and associated procedures.
9. Identify the factors to consider when selecting lifting, rigging and hoisting equipment.
 - i) safety factor
 - ii) load characteristics
 - iii) environment
 - iv) application
 - v) hitch configuration
10. Identify the factors to consider when rigging a load (material/equipment) for hoisting and lifting.
 - i) load characteristics
 - ii) equipment and accessories
 - iii) environmental factors
 - iv) anchor points/attachment locations
 - v) sling angles
 - vi) machine capacity/load chart
 - vii) taglines
11. Explain sling angle when preparing for hoisting and lifting operations.
12. Identify the methods of communication used during lifting, rigging and hoisting operations and describe their associated procedures.
 - i) hand signals
 - ii) electronic communications
 - iii) audible/visual
13. Identify standard hand signals used for lifting, rigging and hoisting operations.
14. Describe the procedures used to inspect, maintain and store lifting, rigging and hoisting equipment.
15. Describe the procedures used to rig and secure a load (material and/or equipment) for lifting and hoisting.
16. Describe the procedures used to perform a basic lift.

Practical Objectives

1. Perform basic hand signals.
2. Tie various types of knots, hitches and bends.

Learning Outcomes:

- Demonstrate knowledge of site layout equipment, its applications and procedures for use.
- Demonstrate knowledge of the procedures used to determine elevations using site layout equipment, and the associated calculations.

2013 National Occupational Analysis:

- 1.05 Uses layout instruments.
- 7.01 Performs site layout.

Suggested Hours:

27 Hours

Objectives and Content:Theoretical Objectives

1. Define terminology associated with basic site layout.
2. Identify hazards and describe safe work practices pertaining to basic site layout.
3. Interpret codes, regulations and applicable covenants pertaining to basic site layout.
4. Interpret information pertaining to basic site layout found on drawings and specifications.
5. Identify tools and equipment used to perform basic site layout and describe their applications and procedures for use.
 - i) string lines
 - ii) levels
 - builders'
 - laser
 - iii) plumb bobs
 - iv) tape measure

6. Explain basic surveying theory as it pertains to site layout.
7. Describe the procedures used to perform basic site layout.
 - i) 3-4-5 method (Pythagorean Theorem)
 - ii) diagonal

Practical Objectives

1. Perform calculations pertaining to basic site layout.
2. Use site layout equipment to determine elevations.

Learning Outcomes:

- Demonstrate knowledge of concrete, its characteristics and applications.
- Demonstrate knowledge of concrete reinforcement and embedded materials and their applications.
- Demonstrate knowledge of concrete tests and their associated procedures.
- Demonstrate knowledge of the procedures used to place, finish and cure concrete.

2013 National Occupational Analysis:

- 9.01 Places concrete.
- 9.02 Facilitates the curing of concrete.
- 9.03 Performs basic concrete finishing.

Suggested Hours:

12 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with concrete.
2. Identify hazards and describe safe work practices pertaining to concrete.
3. Interpret codes and regulations pertaining to concrete.
4. Interpret information pertaining to concrete found on drawings and specifications.
5. Identify tools and equipment used to test, consolidate and finish concrete, and describe their applications and procedures for use.
6. Identify concrete structures and describe their characteristics and applications.
 - i) cast-in-place
 - ii) pre-cast

7. Identify types of concrete reinforcement and describe their applications.
 - i) rebar and accessories
 - ii) stirrups
 - iii) collars
 - iv) fibre
 - v) mesh
 - vi) dowels

8. Identify types of embedded materials and describe their applications.
 - i) anchor bolts
 - ii) inserts
 - iii) weld plates
 - iv) angle iron
 - v) temperature bars
 - vi) water stop
 - vii) form voids
 - viii) sleeves
 - ix) stud welding fasteners
 - x) conduit
 - xi) isolation joint

9. Describe the effects of water/cement ratio on concrete.

10. Describe the effects of aggregate size on concrete.

11. Identify additives/admixtures used in concrete and describe their purpose and applications.

12. Identify types of concrete tests and describe their associated procedures.
 - i) slump
 - ii) air entrainment
 - iii) compression
 - iv) temperature

13. Identify types of joints and describe their applications.
 - i) isolation
 - ii) expansion
 - iii) control
 - iv) construction

14. Describe the procedures used to place, consolidate and finish concrete.
15. Describe the procedures used to facilitate the curing of concrete.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of footings, slab-on-grade, their characteristics and applications.
- Demonstrate knowledge of the procedures used to construct and dismantle footings, slab-on-grade.

2013 National Occupational Analysis:

- 7.02 Lays out concrete formwork.
- 8.03 Constructs footing forms.
- 8.05 Constructs slab-on-grade formwork.
- 8.08 Installs embedded steel.
- 8.09 Dismantles formwork.

Suggested Hours:

24 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with footings, slab-on-grade and grade beam forms.
2. Identify hazards and describe safe work practices pertaining to footings and slab on grade forms.
3. Interpret codes and regulations pertaining to the construction of footings, slab on-grade forms.
4. Interpret information pertaining to footings, slab-on-grade forms found on drawings and specifications.
5. Identify tools and equipment used to construct footings and slab-on-grade, and describe their applications and procedures for use.

6. Identify types of footings and slab-on-grade forms and describe their characteristics and applications.
 - i) piles
 - ii) piers
 - iii) grade beams
 - iv) strip footing
 - v) pad footing
7. Identify form materials and accessories used to construct footings and slab-on-grade forms.
8. Identify the steps involved in the preparation of a site for construction of footings and slab-on-grade forms.
9. Identify factors to consider when constructing footings and slab-on-grade forms..
10. Describe the procedures used to construct footings and slab-on-grade forms.
 - i) insulation
11. Identify types of embedded materials and describe their characteristics and applications.
 - i) rebar
 - ii) anchor bolts
 - iii) mesh
12. Describe the procedures used to place embedded materials.
13. Describe the procedures and products used to dismantle and recondition forms.
14. Calculate materials needed to construct footings and slab-on-grade forms and calculate the volume of concrete required.
15. Identify materials/fasteners, adhesives and connectors used to construct footings, slab-on-grade and describe their characteristics and applications.

Practical Objectives

1. Layout and construct footing forms.

Learning Outcomes:

- Demonstrate knowledge of wall forms, their characteristics and applications.
- Demonstrate knowledge of the procedures used to construct and dismantle wall forms.

2013 National Occupational Analysis:

- 8.04 Constructs wall and grade beam formwork.
- 8.08 Installs embedded steel.
- 8.09 Dismantles formwork.

Suggested Hours:

24 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with wall forms.
2. Identify hazards and describe safe work practices pertaining to wall forms.
3. Interpret codes and regulations pertaining to wall forms.
4. Interpret information pertaining to wall forms found on drawings and specifications.
5. Identify tools and equipment used with wall forms, and describe their applications and procedures for use.
6. Identify types of wall form systems, and describe their characteristics and applications.
 - i) loose forming/panel forming
 - ii) proprietary forming
 - iii) insulated concrete forms (ICF)
 - iv) slip forms/self-jacking forms

7. Identify types of wall form system components, accessories and materials, and describe their purpose and applications.
8. Describe the procedures used to construct wall forms.
9. Identify types of embedded materials and describe their characteristics and applications.
10. Describe the procedures used to place embedded materials.
11. Describe the procedures and products used to dismantle and recondition forms.
12. Calculate materials needed to construct wall forms, and calculate the volume of concrete required.
13. Identify materials/fasteners, adhesives and connectors used to construct wall forms and describe their characteristics and applications.

Practical Objectives

1. Layout and construct a wall form.

Learning Outcomes:

- Demonstrate knowledge of framing systems, their characteristics and applications.

2013 National Occupational Analysis:

12.01 Installs engineered wall systems.

12.02 Constructs dimensional lumber wall framing.

Suggested Hours:

6 Hours

Objectives and Content:Theoretical Objectives

1. Define terminology associated with framing systems.
2. Identify hazards and describe safe work practices pertaining to framing systems.
3. Interpret codes and regulations pertaining to framing systems.
4. Identify types of framing systems, and describe their characteristics and applications.
 - i) balloon
 - ii) platform
 - iii) steel
 - iv) timber
 - v) engineered/manufactured
 - insulated concrete forms (ICF)
 - structural insulated panels (SIP)
 - truss wall system
 - vi) preserved wood foundations
5. Identify methods used to connect, fasten and anchor framing systems.

6. Identify factors to consider when determining framing systems.
 - i) barrier-free/accessibility
 - ii) sound transmission class (STC)
 - iii) fire-ratings
 - iv) energy efficiency
 - v) occupancy
7. Explain the importance of fire stopping, fire blocking and accessory blocking.
8. Identify construction techniques pertaining to framing systems.

Practical Objectives

None

CAR-160

Beams and Supports

Learning Outcomes:

- Demonstrate knowledge of beams and supports, their characteristics and applications.
- Demonstrate knowledge of the procedures used to construct and install beams and supports.

2013 National Occupational Analysis:

- 7.03 Lays out floor systems.
- 7.06 Lays out ceiling systems.
- 10.01 Installs engineered floor systems.
- 10.02 Constructs dimensional lumber floor framing.
- 12.01 Installs engineered wall systems.
- 12.02 Constructs dimensional lumber wall framing.

Suggested Hours:

18 Hours

Objectives and Content:

Theoretical Objectives

1. Define terminology associated with beams and supports.
2. Identify hazards and describe safe work practices pertaining to beams and supports.
3. Interpret codes and regulations pertaining to the construction and installation of beams and supports.
4. Interpret information pertaining to beams and supports found on drawings and specifications.
5. Identify tools and equipment used to construct and install beams and supports, and describe their applications and procedures for use.

6. Identify types of beams and describe their characteristics and applications.
 - i) built-up
 - ii) engineered
 - iii) steel
 - iv) concrete
7. Identify types of beam supports and describe their characteristics and applications.
8. Identify fastening methods used to install beams and supports, and describe their associated procedures.
 - i) grout
 - ii) pockets
9. Describe the forces acting on beams.
10. Identify factors to consider when determining beam and support systems.
11. Identify construction techniques pertaining to beam and support systems.
12. Describe the procedures used to construct built-up beams.
13. Describe the procedures used to install beams and supports.
14. Identify materials/fasteners, adhesives and connectors used to construct beams and supports and describe their characteristics and applications.

Practical Objectives

1. Layout a built-up beam.

Learning Outcomes:

- Demonstrate knowledge of floor systems and their applications.
- Demonstrate knowledge of floor components, accessories and materials and their applications.
- Demonstrate knowledge of the procedures used to layout and frame floor systems with openings.

2013 National Occupational Analysis:

7.03 Lays out floor systems.

Suggested Hours:

24 Hours

Objectives and Content:Theoretical Objectives

1. Define terminology associated with the layout and framing of floor systems.
2. Identify hazards and describe safe work practices pertaining to the layout and framing of floor systems.
3. Interpret codes and regulations pertaining to the layout and framing of floor systems.
4. Interpret information pertaining to floors found on drawings and specifications.
 - i) mechanical/ electrical penetrations
5. Identify tools and equipment used with floor systems, and describe their applications and procedures for use.
6. Identify types of floor systems and describe their applications.
 - i) dimensional lumber
 - ii) engineered

7. Identify floor system components, accessories and materials, and describe their purpose and applications.
 - i) sub-floors
 - ii) bridging/solid blocking
 - iii) strapping
 - iv) sills
8. Identify factors to consider when selecting floor framing systems.
9. Identify construction techniques pertaining to floor framing.
 - i) leveling
 - ii) squaring
10. Describe the procedures used to layout and frame floor systems.
 - i) openings
11. Describe the procedures used to connect, anchor and/or fasten floor systems.
12. Calculate materials needed to construct a floor system.

Practical Objectives

1. Layout a floor system with an opening.

CAR-225

Deck Layout and Framing

Learning Outcomes:

- Demonstrate knowledge of decks and their applications.
- Demonstrate knowledge of deck components, accessories and materials, and their applications.
- Demonstrate knowledge of the procedures used to layout and construct decks.

2013 National Occupational Analysis:

7.04 Lays out deck systems.

11.01 Constructs decks.

11.02 Installs deck components.

Suggested Hours:

9 Hours

Objectives and Content:

Theoretical Objectives

1. Define terminology associated with decks.
2. Identify hazards and describe safe work practices pertaining to decks.
3. Interpret codes and regulations pertaining to decks.
4. Interpret information pertaining to decks found on drawings and specifications.
5. Identify tools and equipment used to layout and construct decks, and describe their applications and procedures for use.
6. Identify types of decks, and describe their characteristics and applications.
7. Identify deck components, accessories and materials, and describe their purpose and applications.
 - i) traditional site-built
 - ii) pre-fabricated (manufactured) prefabricated

8. Identify factors to consider when determining deck systems.
9. Identify the considerations for barrier-free/accessible decks.
 - i) ramps
 - ii) guards/rails
 - iii) landings
10. Identify construction techniques pertaining to deck framing.
11. Describe the procedures used to layout and construct decks.
12. Describe methods used to attach decks to existing structures.
13. Describe methods used to construct free standing/stand-alone decks.
14. Calculate dimensions for ramps and landings.
15. Calculate materials needed to construct a deck.
16. Identify materials/fasteners, adhesives and connectors used to construct decks and describe their characteristics and applications.

Practical Objectives

None

Learning Outcomes:

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

2013 National Occupational Analysis:

- 5.01 Interprets project drawing.
- 5.02 Interprets specifications.
- 5.03 Interprets safety documentation.
- 5.04 Interprets workplace documentation.

Suggested Hours:

3 Hours

Objectives and Content:Theoretical Objectives

1. Define terminology associated with effective communication and trade-related documentation.
2. Explain the importance of effective verbal and non-verbal communication.
 - i) interpersonal interactions
 - other tradespersons
 - colleagues
 - supervisors
 - clients
 - ii) conflict resolution
3. Explain the importance of appropriate and effective use of electronic devices and sources of information.
4. Identify types and sources of trade related documentation and describe their applications.
 - i) manufacturers' specifications
 - ii) codes and standards

- National Building Code (NBC)
 - provincial/municipal codes
 - Canadian Standards Association (CSA)
- iii) energy efficiency guides
 - iv) safety manuals/instructions/signage
 - v) operating manuals
 - vi) permits
 - vii) drawings and specifications
5. Describe the procedures used to access, interpret and apply information found on trade-related documentation.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of project drawings and specifications.
- Demonstrate knowledge of basic sketching techniques.
- Demonstrate knowledge of the procedures used to interpret and extract information from drawings and specifications.

2013 National Occupational Analysis:

- 5.01 Interprets project drawing.
- 5.02 Interprets specifications.
- 6.03 Performs quantity take-off.

Suggested Hours:

27 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with project drawings and specifications.
2. Interpret codes and regulations pertaining to project drawings and specifications.
 - i) federal
 - ii) provincial/territorial
 - iii) municipal
3. Describe the metric and imperial systems of measurement and the procedures used to perform conversions.
 - i) metric to imperial
 - ii) imperial to metric
 - iii) fractions to decimals
 - iv) decimals to fractions
4. Identify types of specification documents and describe their applications.
 - i) code books
 - ii) contract specifications

- iii) manufacturers' specifications
 - iv) national specification format
5. Identify types of drawings and describe their applications.
- i) site/plot/civil
 - ii) architectural
 - iii) mechanical
 - iv) structural
 - v) electrical
 - vi) shop drawings
 - vii) sketches
6. Identify drafting instruments, and describe their applications and procedures for use.
7. Identify documentation related to modifications of drawings and specifications, and describe their applications.
- i) change orders
 - ii) addendums
 - iii) as-builts
8. Identify drawing projections and views and describe their applications.
9. Explain resolution protocols to follow when conflict is identified within a set of project documents.
- i) precedence
 - ii) communication
10. Describe the procedures used to interpret and extract information from drawings and specifications.
- i) alphabet/types of lines
 - ii) symbols and abbreviations
 - iii) projections
 - iv) views
 - v) legend
 - vi) title block
 - vii) general notes
 - viii) schedules
 - ix) scales
 - x) grid lines

- xi) two-dimensional information vs. three-dimensional space
- xii) procedure to report conflict within a set of drawings

Practical Objectives

1. Demonstrate basic sketching techniques.
2. Interpret basic project drawings.

Level 2

Unit Code	Title	Hours	Page
CAR-200	Building Science Principles	9	63
CAR-205	Building Envelope	6	65
CAR-170	Exterior Wall and Partition Layout and Framing	36	67
CAR-250	Preserved Wood Foundations	3	69
CAR-330	Exterior Wall Covering Systems	36	71
CAR-230	Introduction to Roof and Ceiling Layout and Framing	6	73
CAR-235	Gable Roof Layout and Framing	30	75
CAR-240	Roof Coverings	24	77
CAR-605	Exterior Windows	18	79
CAR-325	Exterior Doors	18	81
CAR-245	Straight Stairs	30	83
CAR-210	Advanced Site Layout	24	85

Learning Outcomes:

- Demonstrate knowledge of building science principles and their impact on buildings and their surroundings.

2013 National Occupational Analysis:

- 3.02 Installs membranes and sealants.
- 3.03 Installs foundation protection.
- 3.04 Installs insulating materials

Suggested Hours:

9 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with building science principles.
2. Identify building science principles affecting the surrounding environment.
 - i) wind effects/air flow patterns
 - ii) drainage patterns
 - iii) solar gain
 - iv) shading
 - v) sound transmission
3. Explain heat transfer principles and their impact on buildings.
 - i) conduction
 - ii) convection
 - iii) radiation
4. Explain potential impacts of air leakage and inadequate insulation in buildings.
 - i) ice dams
 - ii) energy inefficiency
 - iii) inclement environment

- iv) condensation, ice and frost build-up
 - v) structural and cosmetic damage
5. Explain the principles of airflow and their impact on buildings.
- i) natural
 - ii) mechanical
6. Explain the principles of moisture flow and its impact on buildings.
- i) moisture movement
 - gravity
 - capillary action
 - airflow
 - diffusion
 - pressure differences
 - hydrostatic pressure
 - ii) sources of moisture
 - dew point and relative humidity
 - leaks
 - occupations (people, plants, and pets)
 - building use
 - environmental
 - iii) effects of moisture
 - deterioration (rot, rust)
 - mold/mildew
 - air quality
7. Explain the principles of sound transmission and its impact on buildings.
- i) sound management mechanisms
 - ii) potential sources of noise
8. Explain the principles of solar gain and its impact on buildings.
- i) building orientation
 - ii) shading strategies
 - iii) glazing

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of the building envelope and its components
- Demonstrate knowledge of the procedures used to install building envelope components.

2013 National Occupational Analysis:

3.02 Installs membranes and sealants.

Suggested Hours:

6 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with the building envelope.
2. Identify hazards and describe safe work practices pertaining to the building envelope.
3. Interpret codes, regulations and manufacturers' specifications pertaining to the building envelope.
4. Interpret information pertaining to the building envelope found on drawings and specifications.
5. Identify types of membranes and describe their purpose and applications.
 - i) vapour barriers
 - ii) waterproofing/damp-proofing barriers
 - iii) air barriers
 - iv) weather/moisture barriers
6. Identify types of tapes and sealants and describe their characteristics and applications.

7. Identify the factors to consider when selecting and installing membranes and sealants.
8. Describe the procedures used to install membranes and sealants.
 - i) foundation
 - ii) floors
 - iii) walls
 - iv) ceilings
 - v) penetrations
 - vi) roof
9. Identify types of insulating materials and describe their characteristics and applications.
10. Identify the factors to consider when selecting and installing insulating materials.
11. Describe the procedures used to install insulating materials.
12. Calculate materials needed to create a building envelope.
13. Identify materials/fasteners, adhesives and connectors used install membranes and describe their characteristics and applications.

Practical Objectives

1. Select and install membranes, sealants and insulating materials.

Learning Outcomes:

- Demonstrate knowledge of walls and partitions and their applications.
- Demonstrate knowledge of wall and partition components, accessories and materials and their applications.
- Demonstrate knowledge of the procedures used to layout and frame walls and partitions.

2013 National Occupational Analysis:

- 7.05 Lays out wall systems.
- 12.01 Installs engineered wall systems.
- 12.02 Constructs dimensional lumber wall framing.

Suggested Hours:

36 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with wall and partition layout and framing.
2. Identify hazards and describe safe work practices pertaining to wall and partition layout and framing.
3. Interpret codes and regulations pertaining to wall and partition layout and framing.
4. Interpret information pertaining to walls and partitions found on drawings and specifications.
5. Identify tools and equipment used with walls and partitions, and describe their applications and procedures for use.

6. Identify types of walls and partitions, and describe their characteristics and applications.
 - i) load bearing
 - ii) non-load bearing
 - iii) timber
 - iv) curtain
7. Identify types of engineered walls and partitions, and describe their characteristics and applications.
8. Identify wall and partition framing components, accessories and materials, and describe their purpose and applications.
 - i) energy efficiency
 - ii) sound transmission
 - ii) fire rating
 - iv) security/safety
 - v) moisture control
9. Identify factors to consider when selecting wall and partition systems.
10. Identify construction techniques pertaining to walls and partitions.
11. Describe the procedures used to layout and frame walls and partitions.
 - i) wood
 - ii) steel
12. Describe the procedures used to erect walls and partitions.
13. Calculate materials needed to construct walls and partitions.
14. Identify materials/fasteners, adhesives and connectors used to construct walls and partitions and describe their characteristics and applications.

Practical Objectives

1. Layout and frame a dimensional lumber load bearing wall with an opening.

Learning Outcomes:

- Demonstrate knowledge of preserved wood foundations and their applications.
- Demonstrate knowledge of the procedures used to construct preserved wood foundations.

2013 National Occupational Analysis:

- 10.02 Constructs dimensional lumber floor framing
- 12.02 Constructs dimensional lumber wall framing.

Suggested Hours:

3 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with preserved wood foundations.
2. Identify hazards and describe safe work practices pertaining to preserved wood foundations.
3. Interpret codes and regulations pertaining to preserved wood foundations.
4. Interpret information pertaining to preserved wood foundations found on drawings and specifications.
5. Identify tools and equipment used with preserved wood foundations, and describe their applications and procedures for use.
6. Identify types of preserved wood foundations.
 - i) with concrete floor slab and wood footings
 - ii) with wood sleeper floors
 - iii) with framed wood floors
 - iv) on concrete strip footings

7. Identify materials used to construct preserved wood foundations, and describe their characteristics and applications.
 - i) bracing, fasteners, adhesives
 - ii) pressure-treated lumber and plywood
 - iii) water-/damp-proofing
 - iv) backfill

8. Identify the factors to consider when constructing preserved wood foundations.
 - i) vertical loads
 - ii) lateral loads
 - iii) size and contact grade of preserved wood material
 - iv) thickness and grade of treated plywood
 - v) stud spacing
 - vi) blocking
 - vii) soil conditions
 - viii) finished grade
 - ix) granular drainage layer
 - x) special drainage requirements

9. Describe the procedures used to construct preserved wood foundations.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of exterior wall covering systems, cladding and trim, their characteristics and applications.
- Demonstrate knowledge of the procedures used to remove and install exterior wall covering systems.
- Demonstrate knowledge of the procedures used to remove and install cladding and trim.

2013 National Occupational Analysis:

16.01 Installs exterior wall components.

16.02 Installs exterior wall coverings.

Suggested Hours:

36 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with exterior wall covering systems, cladding and trim.
2. Identify hazards and describe safe work practices pertaining to exterior wall covering systems, cladding and trim.
3. Interpret codes, regulations and manufacturers' specifications pertaining to exterior wall covering systems, cladding and trim.
4. Interpret information pertaining to exterior wall covering systems, cladding and trim found on drawings and specifications.
5. Identify tools and equipment used with exterior wall covering systems, cladding and trim, and describe their applications and procedures for use.

6. Explain the effect of weather, wind load and pressure changes on exterior wall covering systems cladding and trim.
7. Identify types of exterior wall covering systems and describe their characteristics and applications.
8. Identify types of exterior wall cladding, trim and accessories, and describe their characteristics and applications.
9. Identify the factors to consider when selecting and installing wall covering systems, cladding and trim.
 - i) energy efficiency
 - ii) sound transmission
 - iii) fire rating
 - iv) safety/security
 - v) moisture control
10. Identify methods used to protect against water penetration, and describe their associated procedures.
11. Describe the procedures used to remove and install exterior wall covering systems.
12. Describe the procedures used to remove and install exterior wall cladding and trim.
13. Calculate materials needed to install exterior wall covering systems, cladding and trim.
14. Identify materials/fasteners, adhesives and connectors used to construct wall covering systems and describe their characteristics and applications.

Practical Objectives

1. Install various exterior wall coverings, trim and accessories to manufactures specifications.

Learning Outcomes:

- Demonstrate knowledge of roof framing systems, their characteristics and applications.
- Demonstrate knowledge of roof and ceiling framing components, their purpose and applications.

2013 National Occupational Analysis:

- 7.06 Lays out ceiling systems.
- 7.07 Lays out roof systems.
- 13.01 Installs engineered trusses.
- 13.02 Constructs roof and ceiling framing.

Suggested Hours:

6 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with roof and ceiling layout and framing.
2. Identify hazards and describe safe work practices pertaining to roof and ceiling layout and framing.
3. Interpret codes and regulations pertaining to roof and ceiling layout and framing.
4. Interpret information pertaining to roof and ceiling layout and framing found on drawings and specifications.
5. Identify tools and equipment used with roof and ceiling framing components, and describe their applications and procedures for use.
6. Identify styles of roofs and describe their characteristics and applications.

- i) gable
 - ii) hip
 - iii) flat
 - iv) intersecting (equal and unequal slope)
 - v) shed
 - vi) gambrel
 - vi) mansard
7. Identify types of roof framing systems and describe their characteristics and applications.
- i) wood frame
 - ii) engineered trusses
 - iii) engineered joists
 - iv) timber frame
8. Identify types of roof and ceiling framing components and describe their purpose and applications.
- i) skylights
 - ii) chimneys
 - iii) curbs, parapets and scuppers
 - iv) utilities
 - v) hatches
 - access
 - roof
 - vi) tapered insulation
9. Explain the relationship between roof slopes and ratios, and their application in determining roof dimensions.
10. Identify materials/fasteners, adhesives and connectors used to construct roof and ceiling framing and describe their characteristics and applications.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of components, accessories and materials used to layout and frame gable roofs.
- Demonstrate knowledge of the procedures used to layout and frame gable roofs.

2013 National Occupational Analysis:

13.01 Installs engineered trusses.

13.02 Constructs roof and ceiling framing.

Suggested Hours:

30 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with gable roofs.
2. Identify hazards and safe work practices pertaining to gable roofs.
3. Interpret codes and regulations pertaining to gable roofs.
4. Interpret information pertaining to gable roofs found on drawings and specifications.
5. Identify tools and equipment used in the construction of gable roofs, and describe their applications and procedures for use.
6. Identify gable roof framing components/members, accessories and materials, and describe their purpose, characteristics and applications.
 - i) sheathing
 - ii) fascia
7. Describe the procedures used to layout and frame gable roofs.

8. Describe the procedures used to layout and install engineered gable roof trusses.
 - i) bracing
 - temporary
 - permanent
9. Calculate dimensions associated with gable roof layout.
10. Calculate materials needed to frame a gable roof.
 - i) framing components
 - ii) sheathing
11. Identify materials/fasteners, adhesives and connectors used to construct gable roofs and describe their characteristics and applications.

Practical Objectives

1. Layout and frame a gable roof.

Learning Outcomes:

- Demonstrate knowledge of roof coverings, their characteristics and applications.
- Demonstrate knowledge of roofing accessories, their characteristics and applications.
- Demonstrate knowledge of the procedures used to remove and install roof coverings and accessories.

2013 National Occupational Analysis:

15.01 Installs roofing components.

15.02 Installs roofing coverings.

Suggested Hours:

24 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with roof coverings and accessories.
2. Identify hazards and describe safe work practices pertaining to roof coverings and accessories.
 - i) permanent roof anchors
3. Interpret codes, regulations and manufacturers' specifications pertaining to roof coverings and accessories.
4. Interpret information pertaining to roof coverings and accessories found on drawings and specifications.
5. Identify tools and equipment used with roof coverings and accessories, and describe their applications and procedures for use.

6. Identify types of residential and commercial roof coverings and describe their characteristics and applications.
 - i) sloped
 - ii) flat
7. Identify roofing components and accessories and describe their characteristics and applications.
 - i) flashing
8. Identify fasteners and sealants used with roof coverings and accessories.
9. Explain the importance of sloped roof eave and valley protection.
10. Identify potential roof covering problems and describe the procedures used to prevent them.
11. Describe the procedures used to remove and install roof coverings and accessories.
12. Calculate materials needed to install roof coverings and roofing accessories.

Practical Objectives

1. Install a roof covering.

Learning Outcomes:

- Demonstrate knowledge of window assemblies and accessories.
- Demonstrate knowledge of the procedures used to layout and install window assemblies and accessories.
- Demonstrate knowledge of the procedures used to alter and repair window assemblies and accessories

2013 National Occupational Analysis:

- 14.01 Installs exterior jambs/frames.
- 14.04 Installs exterior windows.
- 14.05 Installs exterior door and window hardware.

Suggested Hours:

18 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with windows.
2. Identify hazards and describe safe work practices pertaining to windows.
3. Interpret codes and regulations pertaining to windows.
4. Interpret information pertaining to windows found on drawings and specifications.
5. Identify tools and equipment used with windows, and describe their applications and procedures for use.
6. Identify types of windows and frames, and describe their characteristics and applications.

7. Identify window hardware, components and accessories, and describe their purpose, characteristics and applications.
8. Identify factors to consider when selecting and installing windows.
 - i) energy efficiency
 - ii) sound reduction
 - iii) fire rating
 - iv) egress
 - v) security/safety
 - vi) moisture control
9. Describe the procedures used to layout and install window assemblies and accessories.
 - i) flashing
 - ii) sloped sill
10. Describe the procedures used to alter and repair window assemblies and accessories.
11. Identify materials/fasteners, adhesives and connectors used to install windows and describe their characteristics and applications.

Practical Objectives

1. Install a window.

Learning Outcomes:

- Demonstrate knowledge of exterior door assemblies and accessories.
- Demonstrate knowledge of the procedures used to layout and install exterior door assemblies and accessories.
- Demonstrate knowledge of the procedures used to alter and repair exterior door assemblies and accessories.

2013 National Occupational Analysis:

- 14.01 Installs exterior jambs/frames.
- 14.02 Installs exterior doors.
- 14.03 Installs specialty exterior doors.
- 14.05 Installs exterior door and window hardware.

Suggested Hours:

18 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with exterior doors.
2. Identify hazards and describe safe work practices pertaining to exterior doors.
3. Interpret codes, regulations and manufacturers' specifications pertaining to exterior doors.
4. Interpret information pertaining to exterior doors found on drawings and specifications.
5. Identify tools and equipment used with exterior doors, and describe their applications and procedures for use.

6. Identify types of exterior doors and frames, and describe their characteristics and applications.
7. Identify exterior door hardware, components and accessories, and describe their purpose, characteristics and applications.
8. Identify factors to consider when selecting and installing exterior doors and frames.
 - i) barrier-free/accessibility
 - ii) energy efficiency
 - iii) sound transmission
 - iv) fire rating
 - v) egress
 - vi) security/safety
 - vii) moisture control
9. Describe the procedures used to layout and install exterior door assemblies and accessories.
 - i) flashing
 - ii) sloped sills
10. Describe the procedures used to alter and repair exterior door assemblies and accessories.
11. Calculate materials needed to install an exterior door assembly.
12. Identify materials/fasteners, adhesives and connectors used to install exterior doors and describe their characteristics and applications.

Practical Objectives

1. Install a door.

Learning Outcomes:

- Demonstrate knowledge of straight stairs, their characteristics and applications.
- Demonstrate knowledge of the procedure used to layout, construct and install straight stairs.

2013 National Occupational Analysis:

7.08 Lays out stairs.

20.03 Constructs stairs.

Suggested Hours:

30 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with straight stairs.
2. Identify hazards and describe safe work practices pertaining to straight stairs.
3. Interpret codes and regulations pertaining to straight stairs.
4. Interpret information pertaining to straight stairs found on drawings and specifications.
5. Identify tools and equipment used with straight stairs, and describe their applications and procedures for use.
6. Describe straight stairs, their characteristics and applications.
7. Identify components of straight stairs and guards and describe their purpose and applications.
 - i) treads
 - ii) risers

- iii) stringers
 - iv) hand rails
 - v) landings
8. Describe the procedures used to layout, construct and install straight stairs and their components.
 9. Calculate straight stair dimensions and stairwell openings.
 10. Identify materials/fasteners, adhesives and connectors used to construct and install straight stairs and describe their characteristics and applications.
 11. Calculate the materials needed to construct straight stairs

Practical Objectives

1. Layout and construct straight stairs.

Learning Outcomes:

- Demonstrate knowledge of site layout tools and equipment, their applications and procedures for use.
- Demonstrate knowledge of the procedures used to layout building lines and their associated calculations.

2013 National Occupational Analysis:

- 1.05 Uses layout instruments.
- 6.02 Performs site preparation.
- 7.01 Performs site layout.

Suggested Hours:

24 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with the layout of building lines.
2. Identify hazards and describe safe work practices pertaining to the layout of building lines.
3. Interpret codes and regulations pertaining to the layout of building lines.
4. Interpret information pertaining to the layout of building lines found on drawings and specifications.
5. Identify tools and equipment used to layout building lines, and describe their applications and procedures for use.
 - i) total stations
 - ii) theodolites
 - iii) transits

6. Describe the procedures used to perform advanced site layout.
 - i) establish offsets
 - ii) determine locations of building and other structures
 - iii) layout building lines
7. Perform calculations pertaining to the layout of building lines.

Practical Objectives

1. Use site layout equipment to layout building lines.

Level 3

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CAR-610	Excavation, Shoring and Underpinning	3	90
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CAR-305	Hip Roof Layout and Framing	30	99
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CAR-405	Interior Wall Systems	15	103
CAR-410	Ceilings	15	106
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CAR-315	Fixtures and Hardware	3	112
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Learning Outcomes:

- Demonstrate knowledge of stair forms, their characteristics and applications.
- Demonstrate knowledge of the procedures used to layout and construct stair forms.
- Demonstrate knowledge of the procedures used to dismantle and recondition stair forms.

2013 National Occupational Analysis:

- 8.07 Constructs stair formwork.
- 8.08 Installs embedded steel.
- 8.09 Dismantles formwork.

Suggested Hours:

21 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with stair forms.
2. Identify hazards and describe safe work practices pertaining to stair forms.
3. Interpret codes and regulations pertaining to stair forms.
4. Interpret information pertaining to stair forms found on drawings and specifications.
5. Identify tools and equipment used with stair forms, and describe their applications and procedures for use.
6. Identify types of concrete stairs and describe their characteristics and applications.

7. Identify concrete stair form components and accessories, and describe their purpose and applications.
8. Identify materials and accessories used to construct stair forms.
9. Describe the procedures used to layout and construct stair forms.
10. Identify types of embedded materials and reinforcing components, and describe their purpose, characteristics and applications.
11. Describe the procedures used to place embedded materials.
12. Describe the procedures and products used to dismantle and recondition stair forms.
13. Calculate materials required to construct concrete stairs.
 - i) stair forms
 - ii) concrete
14. Identify materials/fasteners, adhesives and connectors used to construct stair forms and describe their characteristics and applications.

Practical Objectives

1. Construct concrete stair forms.

Learning Outcomes:

- Demonstrate knowledge of excavation and underpinning its characteristics and application.
- Demonstrate knowledge of the procedures used excavation and underpinning.

2013 National Occupational Analysis:

8.01 Erects excavation shoring and underpinning.

Suggested Hours:

3 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with excavation and underpinning.
2. Identify hazards and describe safe work practices pertaining to excavation and underpinning.
3. Interpret codes, regulations and manufacturers specifications pertaining to excavation and underpinning.
4. Interpret information pertaining to excavation and underpinning found on drawings, specifications and engineers' documentation.
5. Identify tools and equipment used for excavation and underpinning, and describe their applications and procedures for use.
6. Identify types of excavation and underpinning, and describe their characteristics and applications.
7. Identify types of accessories and support structures used in excavation and underpinning, and describe their characteristics and applications.

8. Describe the procedures and products used for excavation and erecting underpinning.
9. Describe the procedures used to shore suspended slabs and beams.
10. Calculate materials needed for excavation and underpinning.
11. Identify materials/fasteners, adhesives and connectors used to shore excavation and underpinning and describe their characteristics and applications.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of pre-cast concrete components.
- Demonstrate knowledge of the procedures used to cast and install pre-cast concrete components.

2013 National Occupational Analysis:

9.04 Installs pre-cast components.

9.05 Installs grout.

Suggested Hours:

6 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with pre-cast concrete.
2. Identify hazards and describe safe work practices pertaining to pre-cast concrete.
3. Interpret codes and regulations pertaining to pre-cast concrete.
4. Interpret information pertaining to pre-cast concrete found on drawings and specifications.
5. Identify tools and equipment used with pre-cast concrete, and describe their applications and procedures for use.
6. Identify pre-cast concrete components, accessories and materials, and describe their characteristics and applications.
 - i) grout
 - ii) shims

7. Describe the procedures used to construct pre-cast concrete components.
 - i) tilt up
8. Describe the procedures used to install pre-cast concrete components and accessories.
9. Describe the procedures used to reinforce pre-cast concrete components.
 - i) pre-stressed
 - ii) post tensioned
10. Identify materials/fasteners, adhesives and connectors used to install pre-cast concrete and describe their characteristics and applications.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of suspended slab and beam forms, their characteristics and applications.
- Demonstrate knowledge of the procedures used to construct and dismantle suspended slab and beam forms.

2013 National Occupational Analysis:

- 8.01 Erects excavation shoring and underpinning.
- 8.02 Erects concrete falsework.
- 8.04 Constructs slab-on-grade formwork.
- 8.05 Constructs slab-on-grade formwork.
- 8.08 Installs embedded steel.
- 8.09 Dismantles formwork.

Suggested Hours:

21 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with suspended slab and beam forms.
2. Identify hazards and describe safe work practices pertaining to suspended slab and beam forms.
3. Interpret codes, regulations and manufacturers' specifications pertaining to the construction of suspended slab and beam forms.
4. Interpret information pertaining to suspended slabs and beams found on drawings, specifications and engineers' documentation.
5. Identify tools and equipment used with suspended slab and beam forms, and describe their applications and procedures for use.

6. Identify types of suspended slab and beam forms, and describe their characteristics and applications.
 - i) mat foundation
 - ii) post tensioned
 - iii) grade beams
 - iv) spandrel beam
7. Identify types of piles and describe their characteristics and applications.
8. Identify types of piers and describe their characteristics and applications.
9. Identify types of form accessories and support structures, and describe their characteristics and applications.
 - i) falsework
 - ii) pans
 - iii) drop panels
 - iv) shores
 - v) re-shores
 - vi) table forms
 - vii) proprietary forms
10. Describe the procedures and products used to construct suspended slab and beam forms.
 - i) joints
 - ii) chase
11. Describe the procedures and products used to dismantle and recondition suspended slab and beam forms.
12. Describe the procedures used to re-shore suspended slabs and beams.
13. Calculate materials needed to construct suspended slab and beam forms, and calculate the volume of concrete required.
14. Identify materials/fasteners, adhesives and connectors used to construct suspended slab and beam forms and describe their characteristics and applications.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of column and vertical forms, their characteristics and applications.
- Demonstrate knowledge of the procedures used to construct and dismantle column and vertical forms.

2013 National Occupational Analysis:

- 8.06 Constructs column formwork.
- 8.08 Installs embedded steel.
- 8.09 Dismantles formwork.

Suggested Hours:

21 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with column and vertical forms.
2. Identify hazards and describe safe work practices pertaining to column forms and vertical forms.
3. Interpret codes and regulations pertaining to column forms and vertical forms.
4. Interpret information pertaining to column forms and vertical forms found on drawings and specifications.
5. Identify tools and equipment used with column and vertical forms, and describe their applications and procedures for use.
6. Identify types of column and vertical form systems, and describe their characteristics and applications.
 - i) loose forming/panel forming

- ii) proprietary (patented) forming
 - iii) insulated concrete forms (ICF)
 - iv) slip forms/self-jacking forms
 - v) fly form
 - vi) gang forms
 - vii) tilt form
7. Identify types of column and vertical form system components, accessories and materials, and describe their purpose and applications.
 8. Describe the procedures used to construct/operate column and vertical forms.
 9. Identify types of embedded materials and describe their characteristics and applications.
 10. Describe the procedures used to place embedded materials.
 11. Describe the procedures and products used to dismantle and recondition forms.
 12. Calculate materials needed to construct column and vertical forms, and calculate the volume of concrete required.
 13. Identify materials/fasteners, adhesives and connectors used to construct column and vertical forms and describe their characteristics and applications.

Practical Objectives

1. Demonstrate how to layout and construct a column and or vertical form.

Learning Outcomes:

- Demonstrate knowledge of components, accessories and materials used to layout and frame hip roofs.
- Demonstrate knowledge of the procedures used to layout and frame hip roofs.

2013 National Occupational Analysis:

- 7.07 Lays out roof systems.
- 13.01 Installs engineered trusses.
- 13.02 Constructs roof and ceiling framing.

Suggested Hours:

30 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with hip roofs.
2. Identify hazards and safe work practices pertaining to hip roofs.
3. Interpret codes and regulations pertaining to hip roofs.
4. Interpret information pertaining to hip roofs found on drawings and specifications.
5. Identify tools and equipment used in the construction of hip roofs, and describe their applications and procedures for use.
6. Identify hip roof framing components, accessories and materials, and describe their purpose, characteristics and applications.
 - i) sheathing
 - ii) fascia
7. Describe the procedures used to layout and frame hip roofs.

8. Describe the procedures used to layout and install engineered hip roof trusses.
9. Calculate dimensions associated with hip roof layout.
10. Calculate materials needed to frame hip roofs.
 - i) framing components
 - ii) sheathing
11. Identify materials/fasteners, adhesives and connectors used to construct a hip roof and describe their characteristics and applications.

Practical Objectives

1. Layout and frame a hip roof.

Learning Outcomes:

- Demonstrate knowledge of components, accessories and materials used to layout and frame equal slope intersecting roofs.
- Demonstrate knowledge of the procedures used to layout and frame equal slope intersecting roofs.

2013 National Occupational Analysis:

7.07 Lays out roof systems.

13.02 Constructs roof and ceiling framing.

Suggested Hours:

30 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with equal slope intersecting roofs.
2. Identify hazards and safe work practices pertaining to equal slope intersecting roofs.
3. Interpret codes and regulations pertaining to equal slope intersecting roofs.
4. Interpret information pertaining to equal slope intersecting roofs found on drawings and specifications.
5. Identify tools and equipment used in the construction of equal slope intersecting roofs, and describe their applications and procedures for use.
6. Identify equal slope intersecting roof framing components, accessories and materials, and describe their purpose, characteristics and applications.
 - i) sheathing
 - ii) fascia

7. Describe the procedures used to layout and frame equal slope intersecting roofs.
8. Describe the procedures used to layout and install engineered equal slope intersecting roof trusses.
9. Calculate dimensions associated with equal slope intersecting roof layout.
10. Calculate materials needed to frame an equal slope intersecting roof.
 - i) framing components
 - ii) sheathing
11. Identify materials/fasteners, adhesives and connectors used to construct equal slope intersecting roofs and describe their characteristics and applications.

Practical Objectives

1. Layout and frame an equal slope intersecting roof.

CAR-405

Interior Wall Systems

Learning Outcomes:

- Demonstrate knowledge of interior wall systems, their characteristics and applications.
- Demonstrate knowledge of the procedures used to remove and install interior wall systems.

2013 National Occupational Analysis:

- 17.01 Installs wallboard.
- 17.02 Installs wall compound.
- 17.03 Installs panels, tiles and solid wood finishes.
- 17.05 Installs demountable wall systems.

Suggested Hours:

15 Hours

Objectives and Content:

Theoretical Objectives

1. Define terminology associated with interior wall systems.
2. Identify hazards and describe safe work practices pertaining to interior wall systems.
3. Interpret codes, regulations and manufacturers' specifications pertaining to interior wall systems.
4. Interpret information pertaining to interior wall systems found on drawings and specifications.
5. Identify tools and equipment used with interior wall systems, and describe their applications and procedures for use.

6. Identify types of interior wall systems and describe their characteristics and applications.
 - i) shaft
 - ii) fire-rated
 - iii) STC-rated
 - iv) demountable
 - office partition
 - v) operable

7. Identify types of wallboard, and describe their characteristics and applications.
 - i) gypsum
 - ii) cementitious
 - iii) fibre board

8. Identify types of panels and tiles and describe their characteristics and applications.
 - i) hardboard
 - ii) laminate
 - iii) acoustical
 - iv) composites
 - v) metal
 - vi) wood

9. Identify interior wall system components, accessories and materials, and describe their purpose, characteristics and applications.
 - i) hardware
 - ii) trim
 - iii) channels
 - iv) furring
 - v) blocking
 - vi) sound barrier

10. Identify factors to consider when selecting and installing interior wall systems.

11. Describe the procedures used to prepare walls for finish.
 - i) acclimatization of products and materials

12. Describe the procedures used to remove and install wall systems.

13. Calculate dimensions associated with interior wall system layout.
14. Calculate components, accessories and materials needed to install interior wall systems.
15. Identify materials/fasteners, adhesives and connectors used to construct interior wall systems and describe their characteristics and applications.

Practical Objectives

1. Install interior cladding.

Learning Outcomes:

- Demonstrate knowledge of ceilings, their characteristics and applications.
- Demonstrate knowledge of the procedures used to layout and install ceilings.
- Demonstrate knowledge of the procedures used to alter and repair ceilings.

2013 National Occupational Analysis:

- 17.01 Installs wallboard.
- 17.02 Installs wall compound.
- 17.03 Installs panels, tiles and solid wood finishes.
- 17.04 Installs suspended ceilings.

Suggested Hours:

15 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with ceilings.
2. Identify hazards and describe safe work practices pertaining to ceilings.
3. Interpret codes, regulations and manufacturers' specifications pertaining to ceilings.
4. Interpret information pertaining to ceilings found on drawings and specifications.
 - i) reflected view
5. Identify tools and equipment pertaining to ceilings, and describe their applications and procedures for use.
6. Identify types of ceilings and describe their characteristics and applications.
 - i) suspended

- ii) non-suspended
 - iii) drop
 - iv) bulkhead
7. Identify ceiling components, accessories and materials, and describe their purpose, characteristics and applications.
 8. Identify factors to consider when selecting and installing ceilings.
 - i) STC rated
 - ii) fire rated
 9. Describe the procedures used to layout and install ceilings.
 10. Describe the procedures used to alter and repair ceilings.
 11. Calculate dimensions associated with ceiling layout.
 12. Calculate components, accessories and materials needed to install ceilings.
 13. Identify materials/fasteners, adhesives and connectors used to ceilings and describe their characteristics and applications.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of interior door and window assemblies and accessories, their characteristics and applications.
- Demonstrate knowledge of the procedures used to layout and install interior doors and window assemblies and accessories.
- Demonstrate knowledge of the procedures used to alter and repair interior door and window assemblies and accessories.

2013 National Occupational Analysis:

- 19.01 Installs interior jambs/frames.
- 19.02 Installs interior doors.
- 19.03 Installs interior windows.
- 19.04 Installs interior door and window hardware.

Suggested Hours:

15 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with interior doors and windows.
2. Identify hazards and describe safe work practices pertaining to interior doors and windows.
3. Interpret codes, regulations and manufactures' specifications pertaining to interior doors and windows.
4. Interpret information pertaining to interior doors and windows found on drawings and specifications.
5. Identify tools and equipment pertaining to interior doors and windows, and describe their applications and procedures for use.

6. Identify types of door jambs and frames, and describe their characteristics and applications.
7. Identify types of interior doors and windows and describe their characteristics and applications.
8. Identify interior door and windows hardware, components and accessories, and describe their purpose, characteristics and applications.
9. Identify factors to consider when selecting and installing interior doors and windows, their hardware, components and accessories.
 - i) barrier-free/accessibility
 - ii) energy efficiency
 - iii) sound reduction
 - iv) fire rating
 - v) egress
 - vi) security/safety
10. Describe the procedures used to layout and install interior door and window assemblies and accessories.
11. Describe the procedures used to alter and repair interior door and window assemblies and accessories.
12. Calculate materials needed to install an interior door and window assembly.
13. Identify materials/fasteners, adhesives and connectors used to install interior doors and windows and describe their characteristics and applications.

Practical Objectives

1. Install an interior door assembly.

CAR-340 Interior Trim

Learning Outcomes:

- Demonstrate knowledge of interior trim its characteristics and applications.
- Demonstrate knowledge of the procedures used to layout and install interior trim.
- Demonstrate knowledge of the procedures used to alter and repair interior trim.

2013 National Occupational Analysis:

- 20.01 Fabricates finish components.
- 20.02 Installs finish components and accessories.

Suggested Hours:

18 Hours

Objectives and Content:

Theoretical Objectives

1. Define terminology associated with interior trim.
2. Identify hazards and describe safe work practices pertaining to interior trim.
3. Interpret codes and manufacturers' specifications pertaining to interior trim.
4. Interpret information pertaining to interior trim work found on drawings and specifications.
5. Identify tools and equipment pertaining to interior trim and describe their applications and procedures for use.
6. Describe the importance of proper handling, storage and preparation of interior trim materials.
 - i) acclimatization of products and materials
7. Identify types of interior trim and describe their characteristics and applications.

8. Describe the procedures used to layout and install interior trim.
9. Describe the procedures used to alter and repair interior trim.
10. Calculate materials needed to install interior trim.
11. Identify materials/fasteners, adhesives and connectors used to fasten interior trim and describe their characteristics and applications.

Practical Objectives

1. Install interior trim.

Learning Outcomes:

- Demonstrate knowledge of fixtures and hardware, their characteristics and applications.
- Demonstrate knowledge of the procedures used to layout and install fixtures and hardware.
- Demonstrate knowledge of the procedures used to alter and repair fixtures and hardware.

2013 National Occupational Analysis:

20.02 Installs finish components and accessories.

Suggested Hours:

3 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with fixtures and hardware.
2. Identify hazards and describe safe work practices pertaining to fixtures and hardware.
3. Interpret codes, regulations and manufacturers' specifications pertaining to fixtures and hardware.
4. Interpret information pertaining to fixtures and hardware found on drawings and specifications.
5. Identify tools and equipment pertaining to fixtures and hardware, and describe their applications and procedures for use.
6. Identify types of fixtures and hardware, and describe their characteristics and applications.

- i) barrier-free/accessibility
 - ii) residential
 - iii) industrial, commercial, institutional (ICI)
7. Identify additional framing or blocking that may be required before installing fixtures and hardware.
 8. Describe the procedures used to layout and install fixtures and hardware.
 9. Describe the procedures used to alter and repair fixtures and hardware.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of
- Demonstrate knowledge of cabinets, countertops and built-in units, their characteristics and applications.
- Demonstrate knowledge of the procedures used to layout, construct and install cabinets, countertops and built-in units.
- Demonstrate knowledge of the procedures used to alter and repair cabinets, countertops and built-in units.

2013 National Occupational Analysis:

20.01 Fabricates finish components.

20.02 Installs finish components and accessories.

Suggested Hours:

12 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with cabinets, countertops and built-in units.
2. Identify hazards and describe safe work practices pertaining to cabinets, countertops and built-in units.
3. Interpret codes, regulations and manufacturers' specifications pertaining to cabinets, countertops and built-in units.
4. Interpret information pertaining to cabinets, countertops and built-in units found on drawings and specifications.
5. Identify tools and equipment pertaining to cabinets, countertops and built-in units, and describe their applications and procedures for use.

6. Identify types of cabinets and built-in units, and describe their characteristics and applications.
7. Identify cabinet and built-in unit hardware, components and accessories, and describe their purpose, characteristics and applications.
8. Identify types of countertops and describe their characteristics and applications.
9. Identify the factors to consider when selecting and installing barrier free/accessible cabinets, built-in units, countertops, hardware, components and accessories.
10. Describe the procedures used to layout and install cabinets.
11. Describe the procedures used to layout, construct and install built-in units.
12. Describe the procedures used to alter and repair cabinets and built-in units.
13. Describe the procedures used to construct and install countertops.
14. Describe the procedures used to alter and repair countertops.
15. Calculate dimensions associated with cabinet and built-in unit layout.
16. Calculate materials needed to install cabinets, built-in units and countertops.
17. Identify materials/fasteners, adhesives and connectors used to install cabinets, countertops and built-in units and describe their characteristics and applications.

Practical Objectives

None

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Level 4

Unit Code	Title	Hours	Page
CAR-445	Project Planning	27	117
CAR-300	Building Science Practices	15	119
CAR-425	Special Roof Layout and Framing	24	121
CAR-435	Unequal Slope Roof Layout and Framing	33	123
CAR-625	Finish and Geometric Stairs	45	125
CAR-350	Flooring and Floorcoverings	15	128
CAR-630	Panels, Tiles and Solid Wood Finishes Installation	6	131
CAR-450	Renovation	15	133
CAR-635	Program Review	30	136

CAR-445 Project Planning

Learning Outcomes:

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

2013 National Occupational Analysis:

- 6.01 Schedules work sequence.
- 6.02 Performs site preparation.
- 6.03 Performs quantity take-off.
- 6.04 Organizes materials.

Suggested Hours:

27 Hours

Objectives and Content:

Theoretical Objectives

1. Define terminology associated with project planning.
2. Interpret information pertaining to project planning found on drawings and specifications.
3. Identify sources of information relevant to project planning.
 - i) documentation
 - specifications
 - codes and regulations
 - reference materials
 - safety manuals
 - ii) drawings
 - iii) related professionals/other trades
 - iv) clients
4. Identify considerations for project planning.
 - i) hazard and environmental assessment
 - ii) human resources
 - iii) barrier free/accessibility

- iv) qualified tradespeople
 - v) tools and equipment
 - vi) materials
 - vii) lead times
 - viii) waste management
 - ix) permits and documentation
 - x) site conditions
 - xi) weather/seasonal conditions
 - xii) budget/cost control
 - xiii) bathrooms
 - xiv) signage
5. Describe the procedures used to plan project tasks.
- i) scheduling
 - ii) estimating
6. Describe the procedures used to organize and store tools, equipment and materials on-site.
7. Explain how changes in workplace documents impact project requirements.
- i) requests for information
 - ii) change orders
 - iii) engineers' reports
8. Identify factors to consider when developing alternate plans to account for changes in project requirements.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of building science practices and their impact on buildings and their surroundings.

2013 National Occupational Analysis:

- 3.02 Installs membranes and sealants.
- 3.03 Installs foundation protection.
- 3.04 Installs insulating materials

Suggested Hours:

15 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with building science practices.
2. Interpret codes, regulations and specifications pertaining to building science practices.
3. Identify energy efficient construction techniques and considerations, and describe their impact on the building as a system.
 - i) thermal mass
 - ii) building orientation
 - iii) solar
 - iv) framing/insulating
 - v) shading
 - vi) reclamation/management of water
4. Identify methods and products that help contribute to an environmentally responsible and sustainable building.
 - i) using recycled/recyclable materials
 - ii) reducing carbon footprint
 - iii) conserving water

- iv) using renewable resources
 - v) employing adaptable building principles
 - vi) maintaining indoor air quality
5. Explain the concept of off-gassing.
 6. Identify types of drainage systems and describe their characteristics and applications.
 7. Describe the procedures used to control air leakage and heat transfer in buildings.
 8. Describe the procedures used to control airflow in buildings.
 9. Describe the procedures used to control moisture flow in buildings.
 10. Describe the procedures used to control sound transmission in buildings.
 11. Describe the procedures used to control or eliminate off-gassing.
 12. Describe the procedures used to control surface and ground water drainage systems.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of components, accessories and materials used to layout and frame special roofs.
- Demonstrate knowledge of the procedures used to layout and frame special roofs.

2013 National Occupational Analysis:

- 7.07 Lays out roof systems.
- 13.01 Installs engineered trusses.
- 13.02 Constructs roof and ceiling framing.

Suggested Hours:

24 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with special roofs.
2. Identify hazards and describe safe work practices pertaining to special roofs.
3. Interpret codes and regulations pertaining to special roofs.
4. Interpret information pertaining to special roofs found on drawings and specifications.
5. Identify tools and equipment used in the construction of special roofs, and describe their applications and procedures for use.
6. Identify types of special roofs and describe their characteristics and applications.
 - i) gambrel
 - ii) mansard
 - iii) polygon
 - iv) flat

- v) deck designated as a low slope roof
 - vi) dormers
 - vii) crickets
7. Identify framing components, accessories and materials for special roofs, and describe their purpose, characteristics and applications.
 8. Describe the procedures used to layout and frame special roofs.
 9. Calculate dimensions associated with special roof layout.
 10. Calculate materials needed to frame a special roof.
 11. Identify materials/fasteners, adhesives and connectors used to construct special roofs and describe their characteristics and applications.

Practical Objectives

1. Construct a special roof.

Learning Outcomes:

- Demonstrate knowledge of components and materials used to layout and frame unequal slope roofs.
- Demonstrate knowledge of the procedures used to layout and frame unequal slope roofs.

2013 National Occupational Analysis:

- 7.07 Lays out roof systems.
- 13.01 Installs engineered trusses.
- 13.02 Constructs roof and ceiling framing.

Suggested Hours:

33 Hours

Objectives and Content:Theoretical Objectives

1. Define terminology associated with unequal slope roofs.
2. Identify hazards and describe safe work practices pertaining to unequal roofs.
3. Interpret codes and regulations pertaining to unequal slope roofs.
4. Interpret information pertaining to unequal slope roofs found on drawings and specifications.
5. Identify tools and equipment used with unequal slope roofs, and describe their applications and procedures for use.
6. Identify types of unequal slope roofs, and describe their characteristics and applications.
 - i) gable
 - ii) hip
 - iii) intersecting

7. Identify unequal slope roof framing components and describe their purpose, characteristics and applications.
8. Describe the procedures used to layout and frame unequal slope roofs.
9. Describe the procedures used to layout and install engineered unequal slope roof trusses.
10. Calculate dimensions associated with unequal slope roof layout.
11. Calculate materials needed to layout and frame unequal slope roofs.
12. Identify materials/fasteners, adhesives and connectors used to construct unequal slope roofs and describe their characteristics and applications.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of geometric stairs their characteristics, components and applications.
- Demonstrate knowledge of the procedures used to layout, construct and install geometric stairs.
- Demonstrate knowledge of finish stairs their characteristics, components and applications.

2013 National Occupational Analysis:

- 7.08 Lays out stairs.
- 20.01 Fabricates finish components.
- 20.02 Installs finish components and accessories.
- 20.03 Constructs stairs.

Suggested Hours:

45 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with finish and geometric stairs.
2. Identify hazards and describe safe work practices pertaining to finish and geometric stairs.
3. Interpret codes and regulations pertaining to finish and geometric stairs.
4. Interpret information pertaining to finish and geometric stairs found on drawings and specifications.
5. Identify tools and equipment pertaining to finish and geometric stairs, and describe their applications and procedures for use.
6. Identify types of geometric stairs and describe their characteristics and applications.

- i) winders
 - ii) curved/spiral
7. Identify types of finish stairs and describe their characteristics applications.
- i) open
 - ii) closed
 - iii) housed
 - iii) laminated
8. Identify components of finish and geometric stairs, and describe their purpose and applications.
- i) balustrades
 - ii) treads
 - iii) risers
 - iv) stringers
 - v) skirt boards
 - vi) mouldings
 - vii) landings
9. Describe the procedures used to layout, construct and install geometric stairs their components and accessories.
10. Describe the procedures used to layout construct and install finish stairs their components and accessories.
11. Calculate dimensions and materials needed to install, layout and construct geometric stairs.
12. Calculate dimensions and materials needed to install, layout and construct finish stairs.
13. Identify materials/fasteners, adhesives and connectors used to construct geometric stairs and describe their characteristics and applications.
14. Identify materials/fasteners, adhesives and connectors used to construct finish stairs and describe their characteristics and applications.

Practical Objectives

1. Layout and construct geometric stairs.

Learning Outcomes:

- Demonstrate knowledge of flooring and floorcoverings, their characteristics and applications.
- Demonstrate knowledge of the procedures used to remove and install flooring and floorcoverings.
- Demonstrate knowledge of the procedures used to install access flooring.

2013 National Occupational Analysis:

18.01 Installs underlayment.

18.02 Installs floor coverings.

18.03 Installs access flooring.

Suggested Hours:

15 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with flooring and floorcoverings.
2. Identify hazards and describe safe work practices pertaining to flooring and floorcoverings.
3. Interpret codes, regulations and manufacturers' specifications pertaining to flooring and floorcoverings.
4. Interpret information pertaining to flooring and floorcoverings found on drawings and specifications.
5. Identify tools and equipment used with flooring and floorcoverings, and describe their applications and procedures for use.
6. Identify types of flooring and describe their characteristics and applications.
 - i) access flooring

- ii) specialty flooring
 - sports floors
 - terrazzo
7. Identify types of floorcoverings and describe their characteristics and applications.
 - i) tile
 - ceramic
 - vinyl composite tile (VCT)
 - rubber/cork
 - carpet
 - ii) wood strip
 - iii) laminate
 - iv) sheet products
 - linoleum
 - vinyl
 8. Identify flooring components, accessories, materials and coatings, and describe their purpose, characteristics and applications.
 9. Identify types of underlayment and describe their characteristics and applications.
 - i) plywood
 - ii) cement boards
 - iii) isolation mats
 - iv) membranes
 10. Explain the effect of contraction and expansion on flooring and floorcoverings.
 11. Describe the procedures used to prepare floor surface for the installation of floorcoverings.
 - i) checking moisture content of substrates
 - ii) acclimatization of products and materials
 - iii) applying leveling compounds
 12. Describe the procedures used to remove and install flooring and floorcoverings.
 13. Describe the procedures used to install access floors.

14. Identify factors to consider when selecting and installing flooring and floorcoverings.
15. Calculate components, accessories, materials and coatings needed to layout and install flooring and floorcoverings.
16. Identify materials/fasteners, adhesives and connectors used to install flooring and floor coverings and describe their characteristics and applications.

Practical Objectives

1. Layout and install flooring.

Learning Outcomes:

- Demonstrate knowledge of panels, tiles and solid wood finishes, their characteristics and applications.
- Demonstrate knowledge of the procedures used to install panels, tiles and solid wood finishes.

2013 National Occupational Analysis:

17.03 Installs panels, tiles and solid wood finishes.

Suggested Hours:

6 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with panels, tiles and solid wood finishes.
2. Identify hazards and describe safe work practices pertaining to panels, tiles and solid wood finishes.
3. Interpret codes, regulations and manufacturers' specifications pertaining to panels, tiles and solid wood finishes.
4. Interpret information pertaining to panels, tiles and solid wood finishes found on drawings and specifications.
5. Identify tools and equipment used with panels, tiles and solid wood finishes, and describe their applications and procedures for use.
6. Identify types of panels and tiles and describe their characteristics and applications.
 - i) hardboard
 - ii) laminate
 - iii) matched veneer

- iv) beadboard
 - v) wainscoting
 - vi) fiberglass reinforced panels (FRP)
 - vii) metal
6. Describe the procedures used to secure trim.
 7. Identify panels, tiles and solid wood finish components, accessories and materials, and describe their purpose, characteristics and applications.
 - i) sealer
 - ii) applied finishes
 - stain
 - paint
 8. Describe the procedures used to prepare wall or ceiling surface according to finish to be applied.
 9. Identify factors to consider when installing panels, tiles and solid wood finishes.
 - i) measuring and layout
 - ii) cutting
 - iii) penetrations
 - iv) moisture
 10. Describe the procedures used to secure panels, tiles, wood finishes and finished trim using fasteners.
 - i) manufactures specifications
 - ii) site conditions
 11. Describe the procedures used to remove panels, tiles and wood finishes.
 12. Calculate dimensions associated with panels, tiles and wood finishes.
 13. Calculate components, accessories and materials needed to install panels, tiles and solid wood finishes.

Practical Objectives

None

CAR-450 Renovation

Learning Outcomes:

- Demonstrate knowledge of the procedures used to renovate existing structures.

2013 National Occupational Analysis:

- 21.01 Removes existing material.
- 21.02 Protects structure during renovations.
- 22.01 Joins new to existing construction.
- 22.02 Changes existing structure during renovations.

Suggested Hours:

15 Hours

Objectives and Content:

Theoretical Objectives

1. Define terminology associated with renovation activities.
2. Identify hazards and describe safe work practices pertaining to renovation activities.
3. Interpret codes, regulations and engineers' documents pertaining to renovation activities.
4. Interpret information pertaining to renovation activities found on drawings and specifications.
5. Identify tools and equipment used when performing renovation activities, and describe their applications and procedures for use.
6. Explain the effects of adding, removing or modifying the layout of structural components.
7. Identify the considerations when performing barrier-free/accessible renovation activities.

8. Explain the importance of conserving historical buildings.
9. Identify materials and components specific to renovation activities.
 - i) hazardous
 - ii) non-hazardous
10. Identify materials and components that can be reused, recycled and reclaimed in the renovation process.
11. Identify destructive and non-destructive methods of identifying and assessing condition of existing structures.
12. Identify considerations when performing demolition and removing existing materials.
13. Describe the procedures used when performing demolition and removing existing materials.
 - i) protecting structures, surfaces and people
 - hoarding
 - shoring
 - underpinning
 - angle of repose
 - separations
 - heating/ventilation/lighting
 - ii) isolating utilities
 - iii) containing and abating materials
 - iv) cataloguing location of materials
 - v) reclaiming/reusing materials
 - vi) disposing of materials
14. Identify considerations when joining new construction to existing structures.
 - i) compatibility of materials
 - ii) jurisdictional requirements and standards
 - iii) structural integrity between new and existing
 - iv) transitioning for aesthetic purposes
 - v) historical building conservation requirements
15. Describe the procedures used to join new construction to existing structures.
16. Identify the considerations when making changes to existing structures.

- i) increasing energy efficiency
- ii) relocation of structural and non-structural components
- iii) condition of existing structural and non-structural support
 - rot/mold
 - damage
 - hazardous materials
 - not compliant with current codes
 - differential movement
- iv) load bearing wall requirements
- v) historical building conservation requirements

17. Describe the procedures used to make changes to existing structures.

Practical Objectives

None

Learning Outcomes:

- Demonstrate knowledge of the National Occupational Analysis and its relationship to the Interprovincial Examination.
- Demonstrate knowledge of overall comprehension of the trade in preparation for the Interprovincial Examination.

2013 National Occupational Analysis:

Entire National Occupational Analysis (NOA)

Suggested Hours:

30 Hours

Objectives and Content:*Theoretical Objectives*

1. Define terminology associated with an NOA.
 - i) blocks
 - ii) tasks
 - iii) sub-tasks

2. Explain how an NOA is developed and the link it has with the Interprovincial Red Seal Examination.
 - i) development
 - ii) validation
 - iii) block and task weighting
 - iv) examination breakdown (pie-chart)

3. Identify Red Seal products and describe their use for preparing for the Interprovincial Red Seal Examination.
 - i) Red Seal website
 - ii) examination preparation guide
 - iii) sample questions
 - iv) examination counselling sheets

4. Explain the relationship between the NOA and the AACS.
5. Review Common Occupational Skills for the Carpenter trade as identified in the NOA.
 - i) tools and equipment
 - ii) safety related activities
 - iii) building materials
 - iv) temporary access structures
6. Review Planning and Layout for the Carpenter trade as identified in the NOA.
 - i) documentation
 - ii) organizes work
 - iii) performs layout
7. Review Concrete for the Carpenter trade as identified in the NOA.
 - i) formwork
 - ii) concrete, cement based and epoxy products
 - iii) building materials
 - iv) temporary access structures
8. Review Framing for the Carpenter trade as identified in the NOA.
 - i) floor systems
 - ii) deck systems
 - iii) wall systems
 - iv) roof and ceiling systems
9. Review Exterior Finish for the Carpenter trade as identified in the NOA.
 - i) exterior doors and windows
 - ii) roofing
 - iii) exterior finishes
10. Review Interior Finish for the Carpenter trade as identified in the NOA.
 - i) wall and ceiling finishes
 - ii) flooring
 - iii) interior doors and windows
 - iv) finish components and stairs
11. Review Renovations for the Carpenter trade as identified in the NOA.
 - i) specific support activities
 - ii) specific construction activities

Practical Objectives

None

Feedback and Revisions

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

New Brunswick:

Apprenticeship and Occupational
Certification
Post-Secondary Education, Training and
Labour
470 York St., Rm. 110, PO Box 6000
Fredericton, NB E3B 5H1
Tel: 506-453-2260
Toll Free in NB: 1-855-453-2260
www.gnb.ca

Prince Edward Island:

Apprenticeship, Training and
Certification
Workforce and Advanced Learning
176 Great George St., PO Box 2000
Charlottetown, PE C1A 7N8
Tel: 902-368-4460
www.apprenticeship.pe.ca

Newfoundland and Labrador:

Apprenticeship and Trades Certification
Advanced Education and Skills
Confederation Building, West Block
Prince Philip Dr., PO Box 8700
St. John's, NL A1B 4J6
Toll Free: 877-771-3737
www.aes.gov.nl.ca/app

Nova Scotia:

Nova Scotia Apprenticeship Agency
2021 Brunswick St., PO Box 578
Halifax, NS B3J 2S9
Tel: 902-424-5651
Toll Free in NS: 1-800-494-5651
www.nsapprenticeship.ca

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

Version Changes

Revision Date	Affected Section	Description of Change