SKILLEDTRADES BC

PROGRAM OUTLINE

Carpenter

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CARPENTER

HARMONIZED PROGRAM OUTLINE

APPROVED BY INDUSTRY

2016

BASED ON

NOA 2014

AND

CCDA HARMONIZATION

RECOMMENDATIONS 2015

Developed by
SkilledTradesBC
Province of British Columbia

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Section 1

INTRODUCTION

Carpenter

Foreword

This revised Carpenter Program Outline is intended as a guide for instructors, apprentices, and employers of apprentices as well as for the use of industry organizations, regulatory bodies, and provincial and federal governments. It reflects updated standards based on the new Carpenter Occupational Analysis (2014) and British Columbia industry and instructor subject matter experts.

Practical instruction by demonstration and student participation should be integrated with classroom sessions. Safe working practices, even though not always specified in each operation or topic, are an implied part of the program and should be stressed throughout the apprenticeship.

This Program Outline includes a list of recommended reference textbooks that are available to support the learning objectives and the minimum shop requirements needed to support instruction.

The Program Outline was prepared with the advice and assistance of the Carpenter Review Committee and will form the basis for further updating of the British Columbia Carpenter Program and learning resources by the Construction Industry Training Organization on behalf of SkilledTradesBC.

Competencies are to be evaluated through written exams and practical assessments. A passing grade is achieved by getting an overall mark of 70%. See the Assessment Guidelines in the Appendix for more details. The types of questions used on these exams must reflect the cognitive level indicated by the learning objectives and the learning tasks listed in the related competencies.

Achievement Criteria are included for those competencies that require a practical component. The intent of including Achievement Criteria in the Program Outline is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner's ability to apply the theory to practice. It is important that these performances be observable and measurable and that they reflect the skills spelled out in the competency as those required of a competent journeyperson. The conditions under which these performances will be observed and measured must be clear to the learner as well as the criteria by which the learner will be evaluated. The learner must also be given the evaluation criteria.

The performance spelled out in the Achievement Criteria is a suggested performance and is not meant to stifle flexibility of delivery. Training providers are welcome to substitute other practical performances that measure similar skills and attainment of the competency. Multiple performances may also be used to replace individual performances where appropriate.

SAFETY ADVISORY

Be advised that references to the WorkSafeBC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation the current Standards and Regulation in BC can be obtained on the following website: http://www.worksafebc.com. Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.

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- Hamish Stewart — British Columbia Regional Council of Carpenters

How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Communicate program length and structure, and all pathways to completion	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
OAC	Communicate the competencies that industry has defined as representing the scope of the occupation	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measureable achievement criteria for objectives with a practical component	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment

Section 2

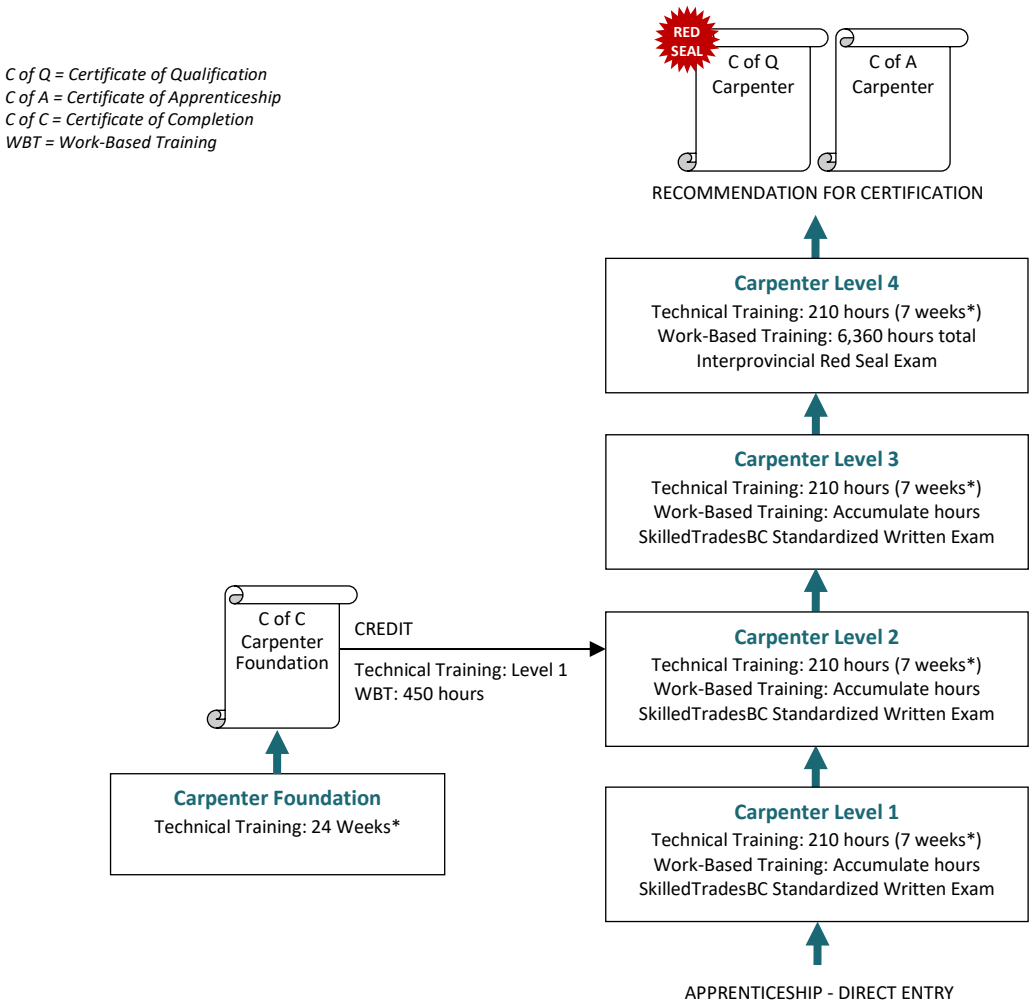
PROGRAM OVERVIEW

Carpenter

Program Credentialing Model

Apprenticeship Pathway

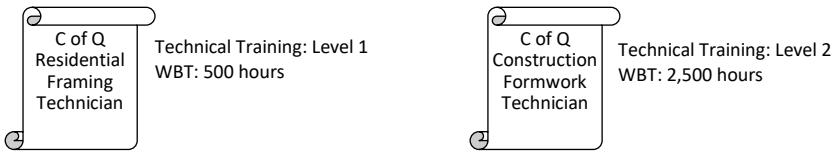
This graphic provides an overview of the Carpenter apprenticeship pathway.



**Suggested duration based on a 30-hour week*

CROSS-PROGRAM CREDITS

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program



Occupational Analysis Chart

CARPENTER

Occupation Description: "Carpenter" means a person who performs all work in connection with the assembly and erection of false work and forms for concrete, wood and metal frame construction, and installs interior and exterior finishing metals for residential, commercial, and industrial projects, while conforming to plans and specifications and local building codes. Other trade skills include layout, rigging/signalling, cutting/welding and the erection and dismantling of scaffolding.

SAFE WORK PRACTICES **A**	Apply Shop and Site Safety Practices A1	1					Apply Personal Safety Practices A2	1											
DOCUMENTATION AND ORGANIZATIONAL SKILLS **B**	Use Construction Drawings and Specifications B1	1	2	3			Interpret Building Codes and Bylaws B2	1	2	3	4		Plan and Organize Work B3	1			4		Perform Trade Math B4	1				
TOOLS AND EQUIPMENT **C**	Use Hand Tools C1	1		3			Use Portable Power Tools C2	1	2				Use Stationary Power Tools C3	1	2	3			Use Oxy-Fuel Equipment C4		2			
SURVEY INSTRUMENTS AND EQUIPMENT **D**	Use Levelling Instruments and Equipment D1	1					Use Site Layout Equipment D2		2		4								

ACCESS, RIGGING AND HOISTING EQUIPMENT **E**	Use Ladders, Scaffolds and Access Equipment E1	1				
	Use Rigging and Hoisting Equipment E2	1				
SITE LAYOUT **F**	Lay Out Building Locations F1	1	2			
	Prepare Building Site F2				4	
	Apply Excavation and Shoring Practices F3			3		
CONCRETE FORMWORK **G**	Use Concrete Types, Materials, Additives and Treatments G1	1		3		
	Select Concrete Forming Systems G2	1		3		
	Build Footing and Vertical Formwork G3	1		3		
	Build Slab-On-Grade Forms and Suspended Slab Forms G4	1	2	3		
	Install Reinforcement and Embedded Items G5	1		3		
	Build Concrete Stair Forms G6			3		
	Place and Finish Concrete G7	1	2			
	Install Specialized Formwork G8			3		
WOOD FRAME CONSTRUCTION **H**	Describe Wood Frame Construction H1	1				
	Select Framing Materials H2	1	2			
	Build Floor Systems H3	1				
	Build Wall Systems H4		2			
	Build Stair Systems H5	1	2		4	
	Build Roof Systems H6		2	3	4	
	Build Specialized Framing Systems H7				4	
	Perform Renovations and Additions H8				4	
	Build Timber and Engineered Wood Construction H9				4	
	Build Decks and Exterior Structures H10	1			4	

FINISHING MATERIALS I	Describe Roofing Materials I1	Install Doors and Hardware I2	Install Windows and Hardware I3	Install Exterior Finishes I4	Install Interior Finishes I5	Install Cabinets I6
		2	2	2	3	3
	Install Interior Floor, Ceiling and Wall Systems I7					
	3					
BUILDING SCIENCE J	Control the Forces Acting on a Building J1	Control Heat and Sound Transmission J2	Control Air and Moisture Movement in Buildings J3			
	1 2 4	2	2			

Training Topics and Suggested Time Allocation

Carpenter – Level 1

			% of Time Allocated to:		
		%	Theory	Practical	Total
Line A	**Safe Work Practices**	**6%**	**70%**	**30%**	**100%**
A1	Apply Shop and Site Safety Practices		✓	✓	
A2	Apply Personal Safety Practices		✓	✓	
Line B	**Documentation and Organizational Skills**	**16%**	**50%**	**50%**	**100%**
B1	Use Construction Drawings and Specifications		✓	✓	
B2	Interpret Building Codes and Bylaws		✓	✓	
B3	Plan and Organize Work		✓	✓	
B4	Perform Trade Math		✓		
Line C	**Tools and Equipment**	**20%**	**60%**	**40%**	**100%**
C1	Use Hand Tools		✓	✓	
C2	Use Portable Power Tools		✓	✓	
C3	Use Stationary Power Tools		✓	✓	
Line D	**Survey Instruments and Equipment**	**6%**	**50%**	**50%**	**100%**
D1	Use Levelling Instruments and Equipment		✓	✓	
Line E	**Access, Rigging and Hoisting Equipment**	**12%**	**40%**	**60%**	**100%**
E1	Use Ladders, Scaffolds and Access Equipment		✓	✓	
E2	Use Rigging and Hoisting Equipment		✓	✓	
Line F	**Site Layout**	**2%**	**30%**	**70%**	**100%**
F1	Lay Out Building Locations		✓	✓	
Line G	**Concrete Formwork**	**20%**	**50%**	**50%**	**100%**
G1	Use Concrete Types, Materials, Additives and Treatments		✓		
G2	Select Concrete Forming Systems		✓		
G3	Build Footing and Vertical Formwork		✓	✓	
G4	Build Slab-On-Grade Forms and Suspended Slab Forms		✓		
G5	Install Reinforcement and Embedded Items		✓		
G7	Place and Finish Concrete		✓		
Line H	**Wood Frame Construction**	**16%**	**60%**	**40%**	**100%**
H1	Describe Wood Frame Construction		✓		
H2	Select Framing Materials		✓		
H3	Build Floor Systems		✓	✓	
H5	Build Stair Systems		✓	✓	
H10	Build Decks and Exterior Structures		✓		
Line J	**Building Science**	**2%**	**100%**	**0%**	**100%**
J1	Control the Forces Acting on a Building		✓		
	Total Percentage for Carpenter Level 1	**100%**			

Training Topics and Suggested Time Allocation

Carpenter – Level 2

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line B	**Documentation and Organizational Skills**	**13%**	**60%**	**40%**	**100%**
B1	Use Construction Drawings and Specifications		✓	✓	
B2	Interpret Building Codes and Bylaws		✓		
Line C	**Tools and Equipment**	**10%**	**40%**	**60%**	**100%**
C2	Use Portable Power Tools		✓	✓	
C3	Use Stationary Power Tools		✓	✓	
C4	Use Oxy-Fuel Equipment		✓	✓	
Line D	**Survey Instruments and Equipment**	**6%**	**70%**	**30%**	**100%**
D2	Use Site Layout Equipment		✓	✓	
Line F	**Site Layout**	**4%**	**50%**	**50%**	**100%**
F1	Lay Out Building Locations		✓	✓	
Line G	**Concrete Formwork**	**10%**	**30%**	**70%**	**100%**
G4	Build Slab-On-Grade Forms and Suspended Slab Forms		✓	✓	
G7	Place and Finish Concrete		✓		
Line H	**Wood Frame Construction**	**20%**	**40%**	**60%**	**100%**
H2	Select Framing Materials		✓		
H4	Build Wall Systems		✓	✓	
H5	Build Stair Systems		✓	✓	
H6	Build Roof Systems		✓	✓	
Line I	**Finishing Materials**	**30%**	**45%**	**55%**	**100%**
I1	Describe Roofing Materials		✓		
I2	Install Doors and Hardware		✓	✓	
I3	Install Windows and Hardware		✓	✓	
I4	Install Exterior Finishes		✓	✓	
Line J	**Building Science**	**7%**	**70%**	**30%**	**100%**
J1	Control the Forces Acting on a Building		✓		
J2	Control Heat and Sound Transmission		✓		
J3	Control Air and Moisture Movement in Buildings		✓	✓	
	Total Percentage for Carpenter Level 2	**100%**			

Training Topics and Suggested Time Allocation

Carpenter – Level 3

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line B	**Documentation and Organizational Skills**	**15%**	**50%**	**50%**	**100%**
B1	Use Construction Drawings and Specifications		✓	✓	
B2	Interpret Building Codes and Bylaws		✓	✓	
Line C	**Tools and Equipment**	**3%**	**20%**	**80%**	**100%**
C1	Use Hand Tools		✓	✓	
C3	Use Stationary Power Tools		✓	✓	
Line F	**Site Layout**	**3%**	**100%**	**0%**	**100%**
F3	Apply Excavation and Shoring Practices		✓		
Line G	**Concrete Formwork**	**35%**	**40%**	**60%**	**100%**
G1	Use Concrete Types, Materials, Additives and Treatments		✓		
G2	Select Concrete Forming Systems		✓		
G3	Build Footing and Vertical Formwork		✓	✓	
G4	Build Slab-On-Grade and Suspended Slab Forms		✓	✓	
G5	Install Reinforcement and Embedded Items		✓	✓	
G6	Build Concrete Stair Forms		✓	✓	
G8	Install Specialized Formwork		✓	✓	
Line H	**Wood Frame Construction**	**20%**	**60%**	**40%**	**100%**
H6	Build Roof Systems		✓	✓	
Line I	**Finishing Materials**	**24%**	**30%**	**70%**	**100%**
I2	Install Doors and Hardware		✓	✓	
I5	Install Interior Finishes		✓		
I6	Install Cabinets		✓	✓	
I7	Install Interior Floor, Ceiling and Wall Systems		✓	✓	
	Total Percentage for Carpenter Level 3	**100%**			

Training Topics and Suggested Time Allocation

Carpenter – Level 4

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line B	**Documentation and Organizational Skills**	**15%**	**50%**	**50%**	**100%**
B2	Interpret Building Codes and Bylaws		✓	✓	
B3	Plan and Organize Work		✓	✓	
Line D	**Survey Instruments and Equipment**	**10%**	**20%**	**80%**	**100%**
D2	Use Site Layout Equipment		✓	✓	
Line F	**Site Layout**	**3%**	**100%**		**100%**
F2	Prepare Building Site		✓		
Line H	**Wood Frame Construction**	**60%**	**50%**	**50%**	**100%**
H5	Build Stair Systems		✓	✓	
H6	Build Roof Systems		✓	✓	
H7	Build Specialized Framing Systems		✓	✓	
H8	Perform Renovations and Additions		✓		
H9	Build Timber and Engineered Wood Construction		✓		
H10	Build Decks and Exterior Structures		✓		
Line I	**Finishing Materials**	**10%**	**50%**	**50%**	**100%**
I5	Install Interior Finishes		✓	✓	
I7	Install Interior Floor, Ceiling and Wall Systems		✓		
Line J	**Building Science**	**2%**	**100%**		**100%**
J1	Control the Forces Acting on a Building		✓		
	Total Percentage for Carpenter Level 4	**100%**			

Section 3

PROGRAM CONTENT

Carpenter

Level 1

Carpenter

Line (GAC): A SAFE WORK PRACTICES

Competency: A1 Apply Shop and Site Safety Practices

Objectives

To be competent in this area, the individual must be able to:

- Describe safe work practices used in a shop and on a construction site.
- Apply safe work practices used in a shop and on a construction site.

LEARNING TASKS	CONTENT

1. Describe Occupational Health and Safety (OHS) Regulation and related materials	• OHS Regulation and WorkSafeBC Standards
	• Legal responsibilities
	  ○ Education and training
	  ○ Orientation processes
	  ○ Toolbox meetings
	• Inspections and investigations
	• WorkSafeBC assessment and penalty costs affecting employers

2. Use OHS Regulation and related materials	• Safety committees
	  ○ Purpose
	  ○ Membership
	  ○ Role of members
	  ○ Meetings and minutes
	• Conduct site inspections
	• Conduct toolbox meetings
	  ○ Purpose
	  ○ Content
	  ○ Timing
	• Conduct site inspections
	  ○ Identification of hazards
	  ○ Recommendations
	  ○ Remedies

3. Describe safe work practices	• Safety gear • Inspect condition of tools • Use proper tools • Guards and barriers • Operating hazardous equipment • Using hazardous materials and harmful substances • Flammable, explosion, and electrical hazards • Grounding of tools and equipment • Lockout procedures • Housekeeping • Using compressed air

	• Sound and light signals • Entering confined spaces
4. Apply safe work practices	• Use OHS Regulation and WorkSafeBC Standards • Site-specific • Harmful substances • Health hazards and work environment controls • Personal protective equipment • Powder-actuated tools • Electrical systems • Temporary lighting • Ladders • Scaffolds, swing stages and miscellaneous stages • Construction procedures • Excavation • Demolition • Rigging • Woodworking machinery and processing

5. Describe fire safety procedures	• Component and causes of fire
	  ○ Fuel
	  ○ Heat
	  ○ Oxygen
	• Solvent flammability
	  ○ Flash points
	• Types of fires
	  ○ Class A, B, C and D fires
	• Use of fire extinguishers
	• Fire prevention equipment
	  ○ Welding blanket
	  ○ Emergency fire blanket
	• Precautions when working with flammable substances
	• Safe use of temporary heating

6. Use Workplace Hazardous Materials Information System (WHMIS)	• WHMIS • Labelling • MSDS • Symbols • Storage

Achievement Criteria

Performance	The learner will interpret information from OHS Regulation.
Conditions	The learner will be given: • Assignment sheet
Criteria	The individual will be evaluated on: • Interpretation of OHS Regulation

Line (GAC): A SAFE WORK PRACTICES

Competency: A2 Apply Personal Safety Practices

Objectives

To be competent in this area, the individual must be able to:

- Control the stresses on the body caused by physical work.
- List the hazards associated with working in confined spaces.
- Select and use fall protection as outlined by the OHS Regulation and WorkSafeBC Standards.
- Select and use personal protective equipment.
- Apply the concepts of personal safety awareness and practices.

LEARNING TASKS	CONTENT
1. Describe roles and responsibilities related to workplace safety	• Personal safety rules • Responsibilities affecting you and others
2. Describes hazard identification in the workplace	• Hazardous materials • Falls • Working at heights • Overhead dangers • Confined spaces • Excavations • Working around equipment • Uneven ground • Changes in conditions
3. Use personal protective equipment and clothing	• Inspect • Adjust • Maintain • Store • Hand protection • Leg and foot protection • Headgear • Eye protection • Ear protection • Lung protection • Personal apparel • Precautions for weather
4. Apply personal safe work practices	• Musculoskeletal Injuries (MSI) • Procedures for using, lifting and carrying objects

LEARNING TASKS	CONTENT

5. Use fall protection systems	• Fall protection systems
	  ○ Guardrails
	  ○ Fall restraint
	  ○ Fall arrest
	• Rope grabs and shock-limiting devices
	• Using safety harness, lanyard, and lifeline
	• Safety equipment inspection

Achievement Criteria

Performance	The learner will apply personal safety practices during all shop activities.
Conditions	The learner will be given: • Workplace orientation • Access to personal safety equipment • Clear expectations • Access to OHS Regulation and WorkSafeBC Standards
Criteria	The learner will start with 100% and a demerit system will deduct a given percentage for safety infractions. A weighting system will be applied to individual safety infractions.

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B1 Use Construction Drawings and Specifications

Objectives:

To be competent in this area, the individual must be able to:

- Describe types of drawings.
- Interpret and extract information from a set of construction drawings.
- Use drawing instructions to create working drawings.

LEARNING TASKS	CONTENT
1. Describe drawings	• Views • Types of drawings
2. Describe the parts of drawings	• Line types • Symbols • Abbreviations • Title block • Borders • Revisions • Legends • Notes
3. Describe the use of scale in drawings	• Ratio and proportion
4. Describe construction documents	• Plot plan • Foundation plan • Floor plans • Elevations • Sections • Details • Schedules • Legal descriptions • Survey plans • Subdivision plans • Surveyor's Certificate • Terms

LEARNING TASKS	CONTENT
5. Use drafting tools and materials	• Drafting board • Drafting table • T- square • Set squares • Scales • Drawing pencils • Templates • Compasses • Erasers • Dusting cloth or brush • Drawing paper • Tracing paper • Drafting or masking tape • Computer-Aided Drafting and Design (CADD)
6. Use architectural drawings	• Building dimensions • Construction type • Room layout • Fixture locations • Finish details

Achievement Criteria 1

Performance	The learner will use drafting tools to draw a project.
Conditions	The learner will be given: • Specifications • Assignment sheet
Criteria	The individual will be evaluated on: • Drafting procedures

Achievement Criteria 2

Performance	The learner will interpret information from a set of building plans.
Conditions	The learner will be given: • Drawings and specifications • Assignment sheet
Criteria	The individual will be evaluated on: • Interpretation of plans

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B2 Interpret Building Codes and Bylaws

Objectives

To be competent in this area, the individual must be able to:

- Identify building codes and bylaws for residential applications.
- Use building codes.
- Describe warranties and the Homeowners' Protection Office.

LEARNING TASKS	CONTENT
1. Describe building codes and bylaws	• National Building Code • BC Building Code • Municipal zone bylaws • Vancouver Building Code • National Fire Code
2. Use building codes and bylaws	• BC Building Code

3. Describe the types and purposes of inspections	• Purpose of inspections
	• Sequence of inspections
	• Work that requires inspections
	  ○ Foundation and forms
	  ○ Perimeter drain, rain water leaders and sumps
	  ○ Rough in plumbing
	  ○ Foundation insulation and ground seal
	  ○ Subtrades (gas, electrical, security, sprinkler, etc.)
	  ○ Chimney and fireplace
	  ○ Framing
	  ○ Insulation and vapour barrier
	  ○ Building envelope
	  ○ Final inspections

Achievement Criteria

Performance	The learner will interpret information from the building code.
Conditions	The learner will be given: • Assignment sheet
Criteria	The individual will be evaluated on: • Interpretation of building code

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B3 Plan and Organize Work

Objectives

To be competent in this area, the individual must be able to:

- Plan and organize a project.
- Handle and store construction materials.

LEARNING TASKS	CONTENT
1. Describe the construction planning process	• Steps required to construct a building • Consult • Budget • Design • Permits and applications • Schedule project • Build
2. Describe manufacturer and supplier documentation	• Types • Uses • Formats • How to access • Storing and record keeping
3. Prepare work plan for a project	• Time • Materials • Tools
4. Store framing materials properly	• Handling • Storage • Protecting

Achievement Criteria

Performance	The learner will prepare a work plan for a content-related practical project.
Conditions	The learner will be given: • Drawings
Criteria	The individual will be evaluated based on: • Completeness of work plan

Line (GAC): B Documentation and Organizational Skills

Competency: B4 Perform Trade Math

Objectives

To be competent in this area, the individual must be able to:

- Use trade mathematics.

LEARNING TASKS	CONTENT
1. Describe trade math concepts	• Mathematical concepts • Application in carpentry trade • Converting between metric and imperial measurements • Use of calculators

2. Use trade math	• Fractions
	• Ratio/proportion
	• Percentage
	• Order of operations (BEDMAS)
	• Geometry
	  ○ Circle math
	  ○ Pythagorean theorem
	  ○ Area and volume calculations
	• Algebra
	• Trigonometry

Line (GAC): C TOOLS AND EQUIPMENT

Competency: C1 Use Hand Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe the use of hand tools.
- Use hand tools.

LEARNING TASKS	CONTENT
1. Describe hand tools	• Measuring and layout • Cutting, boring and shaping • Fastening • Finishing

2. Use measuring and layout tools	• Purpose
	• Types
	  ○ Squares
	  ○ Rulers
	  ○ Tape measures
	  ○ Levels
	  ○ Plumb bobs
	  ○ String lines/chalk lines
	  ○ Marking tools
	• Parts
	• Operation
	• Safety
	• Adjustment
	• Maintenance
	• Storage

LEARNING TASKS	CONTENT

3. Use cutting, boring and shaping tools	• Purpose
	• Types
	  ○ Hand saws
	  ○ Planes
	  ○ Chisels
	  ○ Knives
	  ○ Drill bits
	  ○ Files
	  ○ Rasps
	  ○ Sandpaper
	• Parts
	• Operation
	• Safety
	• Adjustment
	• Maintenance
	• Storage

4. Use fastening tools	• Purpose
	• Types
	  ○ Hammers
	  ○ Screwdrivers
	  ○ Bars
	  ○ Pliers and cutters
	  ○ Wrenches
	• Parts
	• Operation
	• Safety
	• Adjustment
	• Maintenance
	• Storage

Achievement Criteria

Performance	The learner will lay out and build a hand tool project.
Conditions	The learner will be given: • Drawings and specifications • Tools
Criteria	The learner will be evaluated on: • Safety • Tool use • Calculations • Accuracy of layout and cuts • Quality of finished product

Line (GAC): C TOOLS AND EQUIPMENT

Competency: C2 Use Portable Power Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe portable power tools.
- Use portable power tools.

LEARNING TASKS	CONTENT
1. Describe portable power tools	• Cutting • Boring • Shaping • Fastening

2. Describe the use of portable power tools	• PPE
	  ○ Electric
	  ○ Pneumatic
	  ○ Mechanical
	• Operating procedures
	• Following manufacturers' documentation
	• Power supply
	  ○ Disconnect while assembling
	  ○ Check cord
	• Grounding
	• Condition of equipment
	  ○ Guards in place
	  ○ Attachments secure
	  ○ Sharp blades
	  ○ Batteries charged
	• Storage of tools
	• Battery disposal

3. Use portable circular saws	• Purpose
	• Safety
	• Types and sizes
	  ○ Corded
	  ○ Cordless
	• Parts
	• Blade types
	• Operations
	• Accessories
	• Adjustments
	• Maintenance

LEARNING TASKS	CONTENT

4. Use portable mitre saws	• Purpose
	• Safety
	• Types, sizes and capacities
	  ○ Mitre saws
	  ○ Compound mitre saws
	• Parts
	• Operations
	• Accessories
	• Adjustments
	• Maintenance

5. Use portable drills and drivers	• Purpose
	• Safety
	• Types, sizes and speeds
	  ○ Corded
	  ○ Cordless
	• Parts
	• Bit types
	• Fastener types
	• Operations
	• Accessories
	• Adjustments
	• Maintenance

6. Use portable pneumatic tools	• Supply system
	• Purpose
	• Safety
	• Types and sizes
	  ○ Nail guns
	  ○ Staplers
	  ○ Impact wrenches
	• Parts
	• Fastener types
	• Operations
	• Accessories
	• Adjustments
	• Maintenance

LEARNING TASKS	CONTENT

7. Use jigsaws and reciprocating saws	• Purpose
	• Safety
	• Types, sizes and speeds
	  ○ Jigsaws
	  ○ Reciprocating saws
	  ○ Multi tools
	  ○ Corded/cordless
	• Parts
	• Blade types
	• Operations
	• Accessories
	• Adjustments
	• Maintenance

Achievement Criteria

Performance	The learner will lay out and build a project that includes cross, mitre and bevel cuts and ripping with a circular saw.
Conditions	The learner will be given: • Drawings and specifications • Tools
Criteria	The learner will be evaluated on: • Safety • Tool use • Accuracy of layout and cuts • Quality of finished project

Line (GAC): C TOOLS AND EQUIPMENT

Competency: C3 Use Stationary Power Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe stationary power tools.
- Use a table saw and bench grinder.

LEARNING TASKS	CONTENT
1. Describe stationary power tools	• Table saws • Band saws • Jointers • Drill presses • Thickness planers • Sanding machines • Bench grinders
2. Use table saws	• Purpose • Types and sizes • Parts • Blade types and purpose • Accessories • Operations • Types of cuts • Safety • Adjustments • Maintenance • Following manufacturers' documentation
3. Use bench grinders	• Purpose • Wheel types, sizes and speed • Parts • Fastener types • Operations • Accessories • Safety • Adjustments • Maintenance • Following manufacturers' documentation

Achievement Criteria 1

Performance	The learner will perform procedures on a table saw including ripping cuts and cross cuts.
Conditions	The learner will be given: • Table saw
Criteria	The learner will be evaluated on: • Safety • Tool use • Accuracy of dimensions

Achievement Criteria 2

Performance	The learner will use a bench grinder to sharpen a chisel or plane iron.
Conditions	The learner will be given: • A chisel or plane iron • Bench grinder • Sharpening stones
Criteria	The learner will be evaluated on: • Safety • Tool use • Grinding procedure • Whetting procedure • Sharpness of finished edge

Line (GAC): D SURVEY INSTRUMENTS AND EQUIPMENT

Competency: D1 Use Levelling Instruments and Equipment

Objectives

To be competent in this area, the individual must be able to:

- Use optical levels.

LEARNING TASKS	CONTENT
1. Describe levelling equipment	• Purpose • Types of levelling instruments • Builder's levels • Electronic levels • Parts • Types of equipment

2. Use levelling equipment	• Instrument set-up
	• Testing level
	• Levelling rods
	  ○ Parts
	  ○ Scales
	  ○ Rod types
	  ○ Hand signals
	• Electronic and laser levels
	  ○ Parts
	  ○ Setting up procedures
	  ○ Target use
	  ○ Setting elevations
	  ○ Measuring elevations
	• Record elevations
	• Common errors

3. Maintain levelling equipment	• Storage • Transporting • Protection from elements • Cleaning and checking condition of parts

Achievement Criteria 1

Performance	The learner will complete a survey circuit identifying elevations at various locations including a turning point.
Conditions	The learner will be given: • Site plan including survey points • Field book
Criteria	The learner will be evaluated on: • Safety • Accuracy of rod readings • Field book recordings • Instrument set up

Achievement Criteria 2

Performance	The learner will transfer elevations.
Conditions	The learner will be given: • Electronic or optical level, receiver and rod • Survey points
Criteria	The learner will be evaluated on: • Safety • Tool use • Accuracy of elevations

Line (GAC): E ACCESS, RIGGING, AND HOISTING EQUIPMENT

Competency: E1 Use Ladders, Scaffolds and Access Equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe ladders.
- Use a ladder.
- Describe scaffolds and temporary access structures.
- Use scaffolds and temporary access structures.

LEARNING TASKS	CONTENT

1. Describe ladders	• OHS Regulation and WorkSafeBC Standards
	• Ladder ratings
	• Portable ladder safety
	• Ladder types
	  ○ Access ladder
	  ○ Performance ladder
	  ○ Job built ladder
	• Accessories

2. Use ladders	• Safety • Procedure for use • Maintenance • Storage

3. Use scaffolds and temporary access structures	• OHS Regulation and WorkSafeBC Standards
	• General requirements
	• Construction and use
	• Scaffold types
	• Assembly procedures
	• Dismantling procedures
	• Temporary ramps, walkways and stairs
	  ○ Slope regulations
	  ○ Guards

4. Describe access equipment	• OHS Regulation and WorkSafeBC Standards • Swing stages • Suspended power platform • Scissor lifts • Aerial lift

Achievement Criteria

Performance	The learner will set up a scaffold system with an access ladder.
Conditions	The learner will be given: • A scaffold system • A ladder
Criteria	The learner will be evaluated on: • Safety • Tool use • Assembly and disassembly of the scaffold system • Use of an access ladder

Line (GAC): E ACCESS, RIGGING AND HOISTING EQUIPMENT

Competency: E2 Use Rigging and Hoisting Equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe the safe use and maintenance of hoisting equipment.
- Use hoisting equipment.
- Use hand signals to communicate with the hoist operator.

LEARNING TASKS	CONTENT

1. Describe ropes	• Purpose
	• Rope types
	  ○ Fibre
	  ○ Wire
	  ○ Stranding
	• Use of ropes
	• Rope terms
	  ○ Breaking strength
	  ○ Working Load Limits (WLL)
	• Knots, bends and hitches
	  ○ Bowline
	  ○ Figure eight
	  ○ Reef or square knot
	  ○ Sheet bend
	  ○ Round turn and two half-hitches
	  ○ Clove hitch
	  ○ Timber hitch
	  ○ Trucker's knot
	• General rules for tying knots, bends and hitches

2. Describe rigging equipment	• Slings • Web slings • Turnbuckles • Eyes • Shackles • Cable clips and thimbles • Hooks • Spreader bars • Tag lines

LEARNING TASKS	CONTENT

3. Describe cranes and hoists	• Purpose
	• Use
	• Types of cranes
	  ○ Tower
	  ○ Self erect
	  ○ Mobile
	  ○ Boom truck
	  ○ Overhead gantry
	• Types of hoists
	  ○ Forklifts
	  ○ Telehandler
	  ○ Power ladder
	  ○ Come-along
	  ○ Wire rope winch
	  ○ Rollers

4. Describe safe methods of lifting loads with cranes and hoists	• OHS Regulation and WorkSafeBC Standards
	• Certification
	• Training
	• Lift plan
	• High voltage line clearance
	• Overhead hazards
	• Load stability
	• Centre of gravity
	• Sling locations
	• Use of tag lines
	  ○ OHS Regulation and WorkSafeBC Standards
	  ○ Rope for tag lines
	  ○ Length of rope
	  ○ Use of two tag lines
	  ○ Location of attachment for tag lines
	• Use of hand signals
	• Other means of communication
	  ○ Sound signals
	  ○ Radio communication
	  ○ Video systems

5. Use rigging equipment	• OHS Regulation and WorkSafeBC Standards • Safe rigging practices • Unsafe practices • Calculate weight of load

LEARNING TASKS	CONTENT
	• Calculate sling angle and working load limit • Rigging structural shapes • Rigging complex shapes • Blocking and stacking
6. Use hoisting equipment	• OHS Regulation and WorkSafeBC Standards • Follow lift plan • Ground stability • Move and place load
7. Maintain and store rigging and hoisting equipment	• OHS Regulation and WorkSafeBC Standards • Care of slings and wire rope • Wire rope safety • Damages in wire rope • Hook safety • Safety of other hardware • Rings, links and swivels • Eye bolts and ring bolts • Turnbuckles • Shackles • Synthetic web slings • Inspection

Achievement Criteria 1

Performance	The learner will use hand signals for communication with a Mobile Crane Operator.
Conditions	The learner will be given: • A series of crane operations to be signaled
Criteria	The learner will be evaluated on: • Safety • Hand signalling

Achievement Criteria 2

Performance	The learner will select and tie knots, bends and/or hitches.
Conditions	The learner will be given: • Rope
Criteria	The learner will be evaluated on: • Safety • Tying techniques

Line (GAC): F SITE LAYOUT

Competency: F1 Lay Out Building Locations

Objectives

To be competent in this area, the individual must be able to:

- Describe layout, excavation and grading procedures.
- Build batter boards.

LEARNING TASKS	CONTENT
1. Describe excavation and grading procedures	• Clearing the site • Excavate • Cut and fill • Contour lines • Grades • Grade line and grade stakes

2. Build batter boards	• Location
	• Construction
	• Locating lines
	• Tying lines
	• Plumbing down from lines
	• Lay out square corners
	  ○ Measuring diagonals
	  ○ 3-4-5 Method

3. Describe survey markers	• Iron pin • Lead plug • Survey point • Hub • Corner stake • Witness stake • Benchmark • Datum point • Monument • Locate correct plot plans

Achievement Criteria

Performance	The learner will set up batter boards and string lines for a foundation project.
Conditions	The learner will be given: • A foundation plan • Reference points • Tools
Criteria	The learner will be evaluated on: • Safety • Tool use • Setting of string lines • Dimensioning • Construction procedures

Line (GAC): G CONCRETE FORMWORK

Competency: G1 Use Concrete Types, Materials, Additives and Treatments

Objectives

To be competent in this area, the individual must be able to:

- Describe concrete and its uses.

LEARNING TASKS	CONTENT

1. Describe concrete	• Safety
	• Purpose
	• Uses
	• Materials
	  ○ Portland cement
	  ○ Water
	  ○ Aggregates
	  ○ Reinforcing steel
	  ○ Embedded materials
	• Handling
	  ○ Transport
	  ○ Placement
	  ○ Finishing
	  ○ Curing

Line (GAC): G CONCRETE FORMWORK

Competency: G2 Select Concrete Forming Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction of concrete formwork systems.

LEARNING TASKS	CONTENT

1. Describe concrete formwork and falsework	• Safety
	• Efficiency
	• Architectural considerations
	• Glossary of terms
	• Interpret WorkSafeBC regulations and standards for concrete formwork
	• Definitions
	  ○ Responsibility of employer
	  ○ Responsibility of formwork designer
	  ○ Construction requirements
	  ○ Inspection requirements
	  ○ Concrete pre-stressing

2. Describe formwork material and hardware	• Lumber • Plywood • Metal forms • Plywood forms • Ties • Wedges and brackets • Walers, strong backs and bracing • Reglets and inserts

3. Describe concrete joints	• Types
	  ○ Contraction
	  ○ Control
	  ○ Expansion
	  ○ Isolation
	  ○ Construction
	  ○ Cold
	• Methods of construction

Line (GAC): G CONCRETE FORMWORK

Competency: G3 Build Footing and Vertical Formwork

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction of footing, wall and column forms.
- Construct footing, wall and column forms.

LEARNING TASKS	CONTENT
1. Describe footing forms	• Strip footings • Stepped footings • Column footings • Grade beams

2. Describe wall forms	• Built-in-place forms
	  ○ Easy-strip forms
	  ○ Snap tie forms
	  ○ Insulated concrete forming (ICF)
	• Form panels
	• Form ties (wedges)
	• Walers
	• Strong backs
	• Bracing
	• Corner construction
	• Pour strip
	• Chamfer strip
	• Bulkheads and door bucks
	• Corbels
	• Pilasters
	• Methods of construction

3. Describe column forms	• Types
	  ○ Fibre tubes
	  ○ Engineered column
	  ○ Job built
	  ○ Capital
	• Assembly of forms

4. Plan footing, wall and column forms	• Safety • Code • Select materials • Material handling and storage

LEARNING TASKS	CONTENT
	• Schedule • Access
5. Calculate concrete volumes	• Footings • Walls • Columns • Center line
6. Build footing, wall and column forms	• Layout • Assemble • Support • Align • Brace

7. Describe removal of concrete forms	• Safety
	• Concrete design strength
	• OHS and WorkSafeBC regulations
	• Form removal
	  ○ Tool selection
	  ○ Edge protector
	• Re-shoring

Achievement Criteria 1

Performance — The learner will build footing and wall forms using quick strip tie system.

Conditions — The learner will be given:
- A foundation plan which includes bucks, blockouts and pour strip
- Tools

Criteria — The learner will be evaluated on:
- Safety
- Tool use
- Use of material and hardware
- Plumb and level
- Dimensionally accurate, straight and square
- Construction techniques

Achievement Criteria 2

Performance — The learner will build footing, wall and column forms using snap tie system.

Conditions — The learner will be given:
- A foundation plan which includes chamfer strip
- Forming material and hardware
- Tools

Criteria — The learner will be evaluated on:
- Use of material and hardware
- Plumb and level

Dimensionally accurate, straight and square

Line (GAC): G CONCRETE FORMWORK

Competency: G4 Build Slab-On-Grade Forms and Suspended Slab Forms

Objectives

To be competent in this area, the individual must be able to:

- Describe slabs-on-grade.

LEARNING TASKS	CONTENT
1. Describe slabs-on-grade	• Types of slabs • Ground preparation • Strength and durability • Reinforcement • Form system

Line (GAC): G CONCRETE FORMWORK

Competency: G5 Install Reinforcement and Embedded Items

Objectives

To be competent in this area, the individual must be able to:

- Describe the installation of reinforcing bar in concrete.

LEARNING TASKS	CONTENT
1. Describe reinforcing for concrete	• Purpose • Deformed bar • Smooth bar • Sheet or rolled mesh • Size and spacing • Cutting • Splicing • Tying • Anchor bolts

Line (GAC): G CONCRETE FORMWORK

Competency: G7 Place and Finish Concrete

Objectives

To be competent in this area, the individual must be able to:

- Describe methods of placing concrete.

LEARNING TASKS	CONTENT

1. Describe the delivery and placement of concrete	• Safety
	• Manufacture and delivery
	• Placement methods
	  ○ Concrete pumps
	  ○ Chutes
	  ○ Buggies
	  ○ Wheelbarrow
	  ○ Concrete bucket
	  ○ Placement boom
	  ○ Underwater placement
	• Guidelines for placing concrete
	  ○ Consolidation
	  ○ Discharge
	  ○ Weather considerations
	  ○ Segregation
	  ○ Rate of pour
	  ○ Environmental considerations
	• Screed
	• Tools and equipment
	  ○ Power trowels

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H1 Describe Wood Frame Construction

Objectives

To be competent in this area, the individual must be able to:

- Describe the systems and terminology in wood frame construction.

LEARNING TASKS	CONTENT
1. Describe framing systems	• Platform or Western frame construction • Balloon frame construction • Post beam and plank construction • Heavy timber construction • Preserved wood foundations • Energy efficient framing
2. Describe the terms used in wood frame construction	• Structural terms • Architectural terms
3. Describe framing members	• Floors and ceilings • Walls and partitions • Roofs • Trusses • Bracing and blocking • Sheathing
4. Describe roof styles	• Flat • Shed • Gable • Hip • Intersecting • Mansard • Gambrel • Butterfly

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H2 Select Framing Materials

Objectives

To be competent in this area, the individual must be able to:

- Describe standard sizes, species and grades of wood for framing.
- Describe fasteners and hardware for wood framing.

LEARNING TASKS	CONTENT

1. Describe characteristics of wood	• Structural
	• Aesthetic
	• Softwood species
	  ○ Douglas fir
	  ○ Fir
	  ○ Larch
	  ○ Hemlock
	  ○ Spruce
	  ○ Pine
	  ○ Cedar
	• Hard wood species
	  ○ Maple
	  ○ Cherry
	  ○ Oak
	  ○ Birch
	• Tropical hardwoods

2. Describe wood production	• Production methods
	  ○ Sawing
	  ○ Drying
	  ○ Moisture content
	  ○ Planing
	• Sizes
	• Grading
	  ○ Grade stamps
	  ○ Board lumber
	  ○ Light framing
	  ○ Joists and planks
	  ○ Beams and stringers
	  ○ Posts and timbers
	  ○ Decking
	  ○ Siding

3. Describe common defects in wood	• Warp

LEARNING TASKS	CONTENT
	• Compression wood • Mechanical defects • Split, check, shake • Knots • Wane • Pitch, streaks, stained wood • Decay • Insect damage • Manufacturing imperfections
4. Describe manufactured products	• Veneers • Cross-banding • Cores • Adhesives • Softwood plywood grades • Plywood veneers and cores • Faces, backs and cores • Standard sizes and thicknesses
5. Describe fasteners used in wood frame construction	• Nails • Threaded fasteners • Adhesives • Treated wood fasteners
6. Describe hardware used in wood frame construction	• Framing connectors • Treated wood connectors • Seismic connectors

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H3 Build Floor Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction of floors and support systems.
- Build floors and support systems.

LEARNING TASKS	CONTENT

1. Describe floor systems	• Purposes
	• Uses
	• Types of floor systems
	  ○ Lumber
	  ○ Engineered
	• Components of a floor system
	  ○ Pony walls
	  ○ Posts/columns
	  ○ Beams
	  ○ Joists
	  ○ Sheathing
	  ○ Bridging

2. Plan floor systems	• Safety
	• Code requirements
	• Determine materials and sizes
	• Spacing
	• Spans
	• Construction drawings
	• Interpret engineering documents
	  ○ Layout
	  ○ Drilling holes
	  ○ Blocking
	  ○ Fastener selection
	  ○ Temporary bracing
	• Construction sequence
	  ○ Stairwell openings

3. Calculate floor systems	• Spans • Material quantities • Components
4. Build pony walls	• Pony wall construction

LEARNING TASKS	CONTENT
5. Build posts/columns and beams	• Post/column anchorage • Installing posts/columns and beams
6. Build floors	• Layout and installation of sill plates • Layout and installation of joists ○ Stairwell openings • Nailing requirements • Joists supported by steel beams • Layout and installation of bridging or blocking • Installation of sheathing

Achievement Criteria

Performance	The learner will plan, lay out and build a floor system with a stairwell opening.
Conditions	The learner will be given: • Drawings that include openings and provisions for mechanical services
Criteria	The learner will be evaluated on: • Safety • Tool use • Joist layout reflecting needs of services • Sequencing of joists around openings • Compliance with building code • Dimensionally accurate

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H5 Build Stair Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction of straight stairs and handrail.
- Build stairs and handrail.

LEARNING TASKS	CONTENT
1. Describe stair systems	• Purpose • Stair terms
2. Plan straight stairs	• Safety • Code requirements for stairs and handrails • Construction drawings • Construction sequence
3. Calculate straight stairs	• Calculate stair dimensions
4. Build straight stairs	• Layout • Cut • Assemble

Achievement Criteria

Performance	The learner will plan and build straight stairs with a handrail.
Conditions	The learner will be given: • Specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Building Code • Correct calculations, layout and cuts • Dimensionally accurate, straight, square and plumb • Quality of finished project

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H10 Build Decks and Exterior Structures

Objectives

To be competent in this area, the individual must be able to:

- Describe deck systems.

LEARNING TASKS	CONTENT
1. Describe deck systems	• Purpose • Types • Components • Methods
2. Plan deck systems	• Safety • Code requirements • Construction drawings • Construction sequence

Line (GAC): J BUILDING SCIENCE

Competency: J1 Control the Forces Acting on a Building

Objectives

To be competent in this area, the individual must be able to:

- Describe the forces acting on a building.

LEARNING TASKS	CONTENT
1. Describe forces acting on the building structure	• Dead and live loads • Compression, tension, torsion and shear • Uplift • Gravity

Level 2

Carpenter

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B1 Use Construction Drawings and Specifications

Objectives

To be competent in this area, the individual must be able to:

- Describe architectural drawings.
- Describe schedules, details and shop drawings.
- Use schedules, details and shop drawings.
- Draw finishing components.

LEARNING TASKS	CONTENT
1. Describe architectural drawings	• Residential • Industrial, Commercial and Institutional (ICI) • Plans • Sections • Elevations • Shop drawings • As built drawings
2. Use architectural drawings	• Residential • Industrial, Commercial and Institutional (ICI) • Plans • Sections • Elevations • Shop drawings • As built drawings
3. Describe schedules	• Door schedules • Window schedules • Hardware schedules
4. Draw finishing details	• Plan • Section • Elevation • Component identification

Achievement Criteria 1

Performance	The learner will interpret information from a set of construction drawings.
Conditions	The learner will be given: • Drawings and specifications • Assignment sheet
Criteria	The individual will be evaluated on: • Interpretation of plans

Achievement Criteria 2

Performance	The learner will draw plans for a project such as a door or exterior finish detail.
Conditions	The learner will be given: • Project specifications
Criteria	The learner will be evaluated on: • Use of standard construction drawing standards and techniques • Complete and correct content

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B2 Interpret Building Codes and Bylaws

Objectives

To be competent in this area, the individual must be able to:

- Describe permits, inspections and warranties.

LEARNING TASKS	CONTENT
1. Describe the use of municipal permits	• Development of permit application • Building permit application • Demolition permit • Hoarding permit • Gas fitting permit • Plumbing permit • Electrical permit • Fuel tank permit • Sign permit • Water connection permit • Sewer connection permit • Health permit • Occupancy permit
2. Describe warranties and inspections	• Role • Warranty providers • Inspections
3. Describe the Homeowner Protection Office (HPO)	• Definition • Purpose • Licencing/warranty • Research

Line (GAC): C TOOLS AND EQUIPMENT

Competency: C2 Use Portable Power Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe portable power tools.
- Use portable power tools.

LEARNING TASKS	CONTENT
1. Describe powder-actuated tools	• Purpose • Safety • OHS Regulation and WorkSafeBC Standards • Types and sizes • Hazard recognition
2. Describe chain saws	• Purpose • Safety • OHS Regulation and WorkSafeBC Standards • Types, sizes • Hazard recognition • Protective clothing and equipment
3. Describe hammer drills, rotary hammers and demolition hammers	• Purpose • Safety • Types and sizes • Parts • Operations • Accessories • Bit types • Adjustments • Maintenance
4. Describe cut-off saws	• Purpose • Safety • Types and sizes • Parts • Operations • Accessories • Adjustment • Maintenance

5. Describe portable grinders	• Safety • Types and sizes • Parts • Operations • Accessories • Abrasive types and speeds • Adjustment • Maintenance
6. Use portable routers	• Purpose • Types • Parts • Bit types • Tables • Safety • Operation • Maintenance • Storage
7. Use portable sanders	• Purpose • Types • Parts • Abrasive types • Safety • Operation • Maintenance • Storage
8. Use portable power planes	• Purpose • Types • Parts • Blades • Safety • Operation • Maintenance • Storage
9. Use portable biscuit (plate) joiners	• Purpose • Types • Parts • Biscuits • Safety

- Operation
- Maintenance
- Storage

Achievement Criteria

Performance	The learner will use portable power tools.
Conditions	The learner will be given: • Drawings and specifications • Portable power tools
Criteria	The learner will be evaluated on: • Safety • Use of portable power tools

Line (GAC): C TOOLS AND EQUIPMENT

Competency: C3 Use Stationary Power Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe stationary power tools for finishing.
- Use stationary power tools for finishing.

LEARNING TASKS	CONTENT
1. Use a jointer	• Purpose • Types • Parts • Accessories • Knives • Safety • Adjustments • Operations • Maintenance
2. Use a thickness planer	• Purpose • Types • Parts • Accessories • Knives • Safety • Operations • Adjustments • Maintenance
3. Use sanding machines	• Purpose • Types • Parts • Abrasive types • Accessories • Safety • Operations • Adjustments • Maintenance

Achievement Criteria

Performance	The learner will use shop equipment.
Conditions	The learner will be given: • Drawings and specifications • Shop equipment
Criteria	The learner will be evaluated on: • Safety • Use of shop equipment • Selection of proper cutting blades, bits and abrasives • Use of jigs and accessories

Line (GAC): C TOOLS AND EQUIPMENT

Competency: C4 Use Oxy-Fuel Equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe oxy-fuel equipment.
- Use oxy-fuel equipment.

LEARNING TASKS	CONTENT
1. Describe oxy-fuel equipment	• PPE • Operating procedures • Following manufacturers' documentation • Fuel supply • Condition of equipment • Storage
2. Use oxy-fuel equipment	• Purpose • Safety • Parts • Assembly • Operations • Accessories • Adjustments • Maintenance

Achievement Criteria

Performance	The learner will perform basic cutting operations with oxy-fuel equipment.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Use of equipment

Line (GAC): D SURVEY INSTRUMENTS AND EQUIPMENT

Competency: D2 Use Site Layout Equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe electronic layout instruments.
- Use theodolites.

LEARNING TASKS	CONTENT

1. Describe electronic layout instruments	• Purpose
	• Types
	  ○ Theodolites
	  ○ Total stations
	• Parts

2. Use layout equipment	• Calculations • Introduction to trigonometry • Angles • Site plans • Building plans • Storage • Transporting • Protection from elements • Cleaning and checking condition of parts

Achievement Criteria

Performance	The learner will lay out building corners using a theodolite.
Conditions	The learner will be given: • Construction drawings • Theodolite
Criteria	The learner will be evaluated on: • Safety • Use of instrument • Calculation of angles and lengths to locate corners • Accuracy of location of corner stakes

Line (GAC): F SITE LAYOUT

Competency: F1 Lay Out Building Locations

Objectives

To be competent in this area, the individual must be able to:

- Describe site layout.
- Lay out building locations and grades.

LEARNING TASKS	CONTENT
1. Lay out building locations	• Square corners • Trigonometry • Grade stakes • Screed stakes • Gridlines • Slope

Achievement Criteria

Performance	The learner will set a series of screed stakes for a sloping slab-on-grade.
Conditions	The learner will be given: • Site plan • Bench mark elevation
Criteria	The learner will be evaluated on: • Safety • Tool use • Accuracy of stake location and elevations

Line (GAC): G CONCRETE FORMWORK

Competency: G4 Build Slab-On-Grade Forms and Suspended Slab Forms

Objectives

To be competent in this area, the individual must be able to:

- Build slabs-on-grade.
- Build slab tables.

LEARNING TASKS	CONTENT
1. Build slabs-on-grade	• Ground preparation • Form system • Reinforcement • Establishing elevations
2. Build slab tables	• Layout • Assemble • Support system

Achievement Criteria 1

Performance	The learner will build the formwork for a reinforced, sloping slab-on-grade.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Correct installation as per drawings

Achievement Criteria 2

Performance	The learner will build the formwork and falsework for a slab table.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Correct installation as per drawings

Line (GAC): G CONCRETE FORMWORK

Competency: G7 Place and Finish Concrete

Objectives

To be competent in this area, the individual must be able to:

- Describe methods of placing, finishing and curing concrete.
- Describe concrete treatments and sealers.

LEARNING TASKS	CONTENT
1. Describe concrete finishing	• Safety • Tools and equipment • Walls • Flatwork • Procedures • Surface treatments
2. Describe the process of concrete curing	• Hydration • Curing • Sealers and hardeners • Environmental conditions
3. Describe concrete defects	• Types • Causes • Repairs

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H2 Select Framing Materials

Objectives

To be competent in this area, the individual must be able to:

- Select framing materials.

LEARNING TASKS	CONTENT

1. Select framing materials	• Building code requirements
	• Considerations of specific job
	  ○ Materials
	  ○ Cost
	  ○ Environmental conditions
	  ○ Availibility

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H4 Build Wall Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe wood frame walls.
- Build wood frame walls.

LEARNING TASKS	CONTENT

1. Describe wall systems	• Purpose
	• Uses
	• Types of wall systems
	  ○ Exterior
	  ○ Interior
	  ○ Load bearing
	  ○ Point load
	  ○ Non-load bearing
	  ○ Party wall
	  ○ Shear wall

2. Plan wall systems	• Safety
	• Code requirements
	  ○ Determine materials and sizes
	  ○ Spacing
	  ○ Spans
	• Construction drawings
	• Construction sequence
	• Temporary bracing

3. Calculate wall systems	• Spans • Framing materials • Components

4. Build wall systems	• Build exterior walls
	  ○ Layout
	  ○ Assemble
	  ○ Squaring walls
	  ○ Sheathing
	  ○ Standing walls
	  ○ Straightening and bracing walls
	• Build interior walls
	  ○ Layout
	  ○ Assemble

- Standing walls
- Straightening and bracing walls
- Air/vapour barrier continuity
- Fire stops
- Backframing

Achievement Criteria

Performance	The learner will build walls and partitions.
Conditions	The learner will be given: • Drawings
Criteria	The learner will be evaluated on: • Safety • Tool use • Stud layout • Framing around openings • Compliance with code • Dimensionally accurate, square, plumb and level

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H5 Build Stair Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe straight stairs and balustrade.
- Build straight stairs and balustrade.
- Describe finished staircases.

LEARNING TASKS	CONTENT

1. Describe stairs and balustrade	• Purpose
	• Uses
	• Types
	  ○ Straight
	  ○ Multi-flight
	  ○ Geometric
	• Stair terms
	• Stair components
	• Balustrade components

2. Plan stairs and balustrade	• Safety • Code requirements for stairs and balustrades • Construction drawings ○ Design considerations • Construction sequence
3. Calculate stairs and balustrade	• Proportioning rules • Rise and run • Stairwell openings • Stair dimensions • Materials
4. Build stairs and balustrade	• Layout • Cut • Assemble

Achievement Criteria

Performance	The learner will plan and build straight stairs with a balustrade.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with code • Calculations, layout and cuts • Dimensionally accurate, straight, square and plumb • Quality of finished project

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H6 Build Roof Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction of gable roofs.
- Frame gable roofs.
- Describe truss roofs.

LEARNING TASKS	CONTENT
1. Describe gable roof systems	• Purpose • Uses • Types • Components
2. Plan gable roof systems	• Safety • Code requirements • Construction drawings • Construction sequence
3. Calculate gable roof systems	• Calculate theoretical lengths • Calculate quantities of ceiling and roof framing materials
4. Build gable roof systems	• Lay out roof members • Lay out plate • Cut members • Assemble
5. Describe truss roofs	• Safety • Interpret manufacturers' documentation • Layout of trusses • Handling and installation of trusses • Fastening trusses • Bracing requirements

Achievement Criteria

Performance	The learner will build a gable roof with ceiling joists.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Calculation and layout of ceiling joists, rafters and other roof framing members • Dimensionally accurate, straight and square • Accuracy of cuts

Line (GAC): I FINISHING MATERIALS

Competency: I1 Describe Roofing Materials

Objectives

To be competent in this area, the individual must be able to:

- Describe roofing materials.
- Describe the installation of roofing materials.

LEARNING TASKS	CONTENT
1. Describe roofing materials	• Purpose • Types • Re-roofing • Flashing • Underlay • Accessories • Fasteners
2. Plan for the installation of roofing materials	• Safety • Code requirements • Tools • Protect existing surfaces • Removing existing roofing materials • Underlay • Flashing • Accessories
3. Calculate roofing materials	• Coverage • Waste factors • Accessories

Line (GAC): I FINISHING MATERIALS

Competency: I2 Install Doors and Hardware

Objectives

To be competent in this area, the individual must be able to:

- Describe exterior doors.
- Install exterior doors.

LEARNING TASKS	CONTENT
1. Describe exterior doors	• Common types • Special types • Construction • Purpose • Terminology • Code and security requirements • Weather and air sealing • Storage during construction • Swing/hand of door
2. Describe specialty exterior doors	• Types • Purpose • Installation
3. Describe exterior door jambs	• Types • Purpose • Construction
4. Describe exterior door hardware	• Types • Purpose • Storage • Labelling
5. Install exterior doors	• Rough openings • Hanging and fitting
6. Install exterior door hardware	• Types • Operation • Fitting • Templates

Achievement Criteria

Performance	The learner will hang and install an exterior door.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code • Installation of door to specified tolerances • Installation of hardware

Line (GAC): I FINISHING MATERIALS

Competency: I3 Install Windows and Hardware

Objectives

To be competent in this area, the individual must be able to:

- Describe windows.
- Install windows.

LEARNING TASKS	CONTENT
1. Describe windows and hardware	• Purpose • Code requirements • Types • Components • Construction • Energy efficiency • Storage • Operation
2. Plan window installation	• Drawings and specifications • Manufacturers' specifications • Delivery • Storage • Access • Installation • Protection
3. Install windows	• Fitting • Plumb • Level • Shimming • Fastening • Sealing • Accessories

Achievement Criteria

Performance	The learner will install a window with flashing.
Conditions	The learner will be given: • A rough opening • A window • Weather proofing material
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code and jurisdictional regulations • Compliance with manufacturers' specifications • Preparation of opening • Positioning of window in rough opening • Installation of flashing and membranes

Line (GAC): I FINISHING MATERIALS

Competency: I4 Install Exterior Finishes

Objectives

To be competent in this area, the individual must be able to:

- Describe building envelope requirements.
- Describe exterior finishing materials.
- Install exterior finishing materials.

LEARNING TASKS	CONTENT
1. Describe building envelope	• Code requirements • Purpose • Terminology • Types of barriers • Rainscreen • Energy efficiency
2. Describe exterior finish materials	• Code requirements • Purpose • Types of cladding • Trim and accessories • Types • Fasteners
3. Plan exterior finish installation	• Safety • Code requirements • Drawings and specifications • Sequence of installation • Delivery • Storage • Access • Installation • Protection
4. Calculate exterior finish materials	• Materials • Components • Accessories
5. Install exterior finishes	• Layout • Installation

Achievement Criteria

Performance	The learner will install exterior siding materials including flashing.
Conditions	The learner will be given: • Framed wall with building envelope penetrations and cornice • Siding and soffit material • Flashing and barrier material
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code • Compliance with manufacturers' specifications • Properly installed details for building envelope penetrations • Installation of flashing and siding

Line (GAC): J BUILDING SCIENCE

Competency: J1 Control the Forces Acting on a Building

Objectives

To be competent in this area, the individual must be able to:

- Describe the forces acting on a building.
- Describe the construction details for wood frame seismic applications.

LEARNING TASKS	CONTENT
1. Describe seismic applications	• Purpose • Types • Describe seismic hardware

Line (GAC): J BUILDING SCIENCE

Competency: J2 Control Heat and Sound Transmission

Objectives

To be competent in this area, the individual must be able to:

- Describe methods of controlling heat and sound transmission.
- Describe energy efficient framing.
- Control heat and sound transmission.

LEARNING TASKS	CONTENT
1. Describe heat transmission	• Principles • Code requirements • Methods of controlling • Materials
2. Describe sound transmission	• Principles • Code requirements • Methods of controlling • Materials
3. Describe insulating materials	• Types • Purpose • Calculation of materials • Operation • Framing to accommodate insulation • Installation • Insulating value • Increase energy efficiency

Line (GAC): J BUILDING SCIENCE

Competency: J3 Control Air and Moisture Movement in Buildings

Objectives

To be competent in this area, the individual must be able to:

- Describe methods of controlling air, moisture and vapour movement.
- Install air, moisture and vapour control products.

LEARNING TASKS	CONTENT
1. Describe air movement	• Purpose • Principles • Code requirements • Methods of controlling • Gas and smoke barriers
2. Describe moisture movement	• Purpose • Principles • Code requirements • Methods of controlling
3. Describe vapour movement	• Purpose • Principles • Code requirements • Methods of controlling
4. Install air, moisture and vapour control products	• Drawings and specifications • Manufacturers' specifications • Materials • Methods

Achievement Criteria

Performance	The learner will install rainscreen for exterior cladding.
Conditions	The learner will be given: • Framed wall section with a window
Criteria	The learner will be evaluated on: • Safety • Tool use • Accurate detailing

Level 3

Carpenter

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B1 Use Construction Drawings and Specifications

Objectives

To be competent in this area, the individual must be able to:

- Describe structural drawings and specifications.
- Use schedules, details and shop drawings.
- Interpret reflected ceiling plans.

LEARNING TASKS	CONTENT
1. Describe structural drawings and specifications	• Types of drawings • Schedules • Specifications • Gridlines • Millwork drawings
2. Describe schedules	• Door schedules • Window schedules • Room finish schedules • Hardware schedules
3. Describe shop drawings	• Interior elevations • Millwork drawings
4. Use structural drawings	• Specifications • Schedules • Building dimensions • Construction type • Mechanical and electrical systems
5. Interpret reflected ceiling plans	• Reflected ceiling plans • Specialties • Hardware
6. Draw formwork details	• Plan view • Section view

Achievement Criteria 1

Performance	The learner will interpret information from a set of structural drawings.
Conditions	The learner will be given: • Drawings and specifications • Question sheet
Criteria	The individual will be evaluated on: • Interpretation of plans

Achievement Criteria 2

Performance	The learner will draw formwork details, including plan and section views.
Conditions	The learner will be given: • Specifications
Criteria	The learner will be evaluated on: • Required construction details as per drawings • Proper drawing technique

Achievement Criteria 3

Performance	The learner will estimate a reflected ceiling plan, including items such as lighting fixtures and bulkheads.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Accuracy of materials take off

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B2 Interpret Building Codes and Bylaws

Objectives

To be competent in this area, the individual must be able to:

- Use building codes.

LEARNING TASKS	CONTENT
1. Interpret building codes and bylaws	• Guards • Ramps • Egress • Area of refuge • Hoarding • Demolition • Concrete mixes • Accessibility • Fire separation • Fire rating

Achievement Criteria

Performance	The learner will interpret information from the building code.
Conditions	The learner will be given: • Question sheet
Criteria	The individual will be evaluated on: • Interpretation of building code

Line (GAC): C TOOLS AND EQUIPMENT

Competency: C1 Use Hand Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe finishing tools.
- Use hand tools for finishing work.

LEARNING TASKS	CONTENT

1. Describe finishing tools	• Purpose
	• Types
	  ○ Marking tools
	  ○ Squares
	  ○ Chisels
	  ○ Smoothing tools
	  ○ Scrapers
	  ○ Clamps
	  ○ Coping saws

2. Use finishing tools	• Safety • Adjustment • Operation • Maintenance • Storage

Achievement Criteria

Performance	The learner will use and maintain hand tools.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use and maintenance

Line (GAC): C TOOLS AND EQUIPMENT

Competency: C3 Use Stationary Power Tools

Objectives

To be competent in this area, the individual must be able to:

- Describe stationary power tools.
- Use shop equipment.

LEARNING TASKS	CONTENT
1. Use band saws	• Safety • Purpose • Types • Parts • Blade types • Adjustments • Operations • Accessories • Maintenance
2. Use a drill press	• Safety • Purpose • Types • Parts • Bit types • Operations • Accessories • Maintenance

Achievement Criteria

Performance	The learner will use shop equipment.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Selection, use and maintenance shop equipment • Selection of cutting blades, bits and abrasives • Use of jigs and accessories

Line (GAC): F SITE LAYOUT

Competency: F3 Apply Excavation and Shoring Practices

Objectives

To be competent in this area, the individual must be able to:

- Describe excavations and shoring.
- Plan excavations and shoring.
- Calculate excavation volumes.

LEARNING TASKS	CONTENT
1. Describe excavations	• Safety • Purpose • Bulk excavations • Trench excavations • Deep excavations • Soil conditions • Soil types • Bearing capacities of soils • Underpinning
2. Describe shoring	• Types • Slope stabilization
3. Plan excavations and shoring	• Safety • Weather conditions • Site survey • Grading • Grid lines and grade stakes • Excavation planning • Describe backfilling
4. Calculate excavations	• Estimate volume of excavated material

Line (GAC): G CONCRETE FORMWORK

Competency: G1 Use Concrete Types, Materials, Additives and Treatments

Objectives

To be competent in this area, the individual must be able to:

- Describe concrete types, materials and admixtures.

LEARNING TASKS	CONTENT
1. Describe the uses for concrete	• Structural • Architectural • Fire proofing • Insulating • Conduits • Pavements
2. Describe concrete mix designs	• Strength • Durability • Water tightness • Finishing ability
3. Describe the types of admixtures and treatments for concrete	• Air-entraining • Water-reducing • Plasticizers • Retardants • Accelerators • Colours • Dampproofing and permeability-reducing agents • Bonding agents • Release agents • Gas-forming agents • Pozzolans
4. Describe structural grout	• Purpose • Types • Procedures

Line (GAC): G CONCRETE FORMWORK

Competency: G2 Select Concrete Forming Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe concrete forming systems.
- Select concrete forming systems.

LEARNING TASKS	CONTENT
1. Describe the factors affecting form design	• Safety • Architectural design • Concrete members • Efficiency • Environmental conditions • Form pressures • Slump • Temperature • Vibration • Placement method • Form size • Cantilever formwork • Concrete design mix
2. Describe specialized formwork	• Specialized formwork • Sandblasted and tooled concrete • Rustication and form liners • Architectural • Engineered systems • Describe manufactured wall form panels

Line (GAC): G CONCRETE FORMWORK

Competency: G3 Build Footing and Vertical Formwork

Objectives

To be competent in this area, the individual must be able to:

- Describe concrete forming systems.
- Construct concrete forming systems.

LEARNING TASKS	CONTENT
1. Describe footing forms	• Raft slabs • Mass pad • Pile cap • Caissons • Piles
2. Describe pile foundations	• Types • Parts • Grade beams • Uses • Designs
3. Describe wall forms	• Engineered wall system • Gang forms • Construction procedures • Form details
4. Describe insulated concrete forms (ICF)	• Components and hardware • ICF foundation walls • Above ground flat ICF walls

5. Plan footing and vertical formwork	• Safety
	• Contract drawings
	• Engineered drawings
	• Procedures
	  ○ Form system
	  ○ Lift plan
	  ○ Concrete placement
	• Material handling and storage
	• Schedule
	• Access

LEARNING TASKS	CONTENT

6. Calculate forming materials and concrete volumes	• Contact area
	• Concrete wall volume
	  ○ Battered
	  ○ Circular
	  ○ Polygon
	• Components

7. Construct vertical formwork	• Layout • Assembly • Alignment • Form removal

Achievement Criteria

Performance	The learner will build a gang form.
Conditions	The learner will be given: • Specifications • Construction drawings
Criteria	The learner will be evaluated on: • Safety • Tool use • Use of forms and hardware • Plumb and level • Dimensionally accurate, straight and square

Line (GAC): G CONCRETE FORMWORK

Competency: G4 Build Slab-On-Grade Forms and Suspended Slab Forms

Objectives

To be competent in this area, the individual must be able to:

- Describe suspended slab construction.
- Build suspended slabs.

LEARNING TASKS	CONTENT
1. Describe suspended slabs	• Types of slabs • Slab components • Suspended slab forming products • Specifications
2. Describe shoring and re-shoring for falsework systems	• Safety • Installation drawings • Re-shoring requirements • Re-shoring systems

3. Plan suspended slab formwork	• Safety
	• Construction drawings
	• Procedures
	  ○ Form system
	  ○ Lift plan
	  ○ Concrete placement
	  ○ Form removal
	• Material handling and storage
	• Schedule
	  ○ Sub-trades

4. Calculate forming materials and concrete volumes	• Concrete volume • Components
5. Construct suspended slabs	• Layout • Assembly • Alignment • Form removal

Achievement Criteria 1

Performance	The learner will install chamfer strips including mitres and 3-way corners.
Conditions	The learner will be given: • Specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Correct installation • Fit

Achievement Criteria 2

Performance	The learner will build suspended slab forms including a beam or a girder.
Conditions	The learner will be given: • Construction drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Use of forms and hardware • Plumb and level • Dimensionally accurate, straight and square

Line (GAC): G CONCRETE FORMWORK

Competency: G5 Install Reinforcement and Embedded Items

Objectives

To be competent in this area, the individual must be able to:

- Describe concrete reinforcement.
- Describe embedded metals and plastics.
- Install anchor bolt templates.

LEARNING TASKS	CONTENT
1. Describe embedded materials	• Anchor bolts • Machine base bolts • Sleeves • Reglets • Dowels • Manhole cover frames • Grates, catch basins and drain troughs or trenches • Dock levellers • Water stops • Specialty items
2. Describe door frames used in concrete and masonry walls	• Types of frames • Methods of installation
3. Describe concrete fastening systems	• Grout • Metal anchors • Chemical anchors • Mechanical anchors • Powder actuated fasteners

Achievement Criteria

Performance	The learner will lay out and install an anchor bolt template.
Conditions	The learner will be given: • Construction drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Accuracy • Installation

Line (GAC): G CONCRETE FORMWORK

Competency: G6 Build Concrete Stair Forms

Objectives

To be competent in this area, the individual must be able to:

- Describe concrete stair construction.
- Build concrete stair forms.

LEARNING TASKS	CONTENT
1. Describe concrete stairs	• Cast-in-place stairs • Pre-cast stairs • Concrete finishes and nosings • Components

2. Plan concrete stair form	• Safety
	• Code requirements
	• Construction drawings
	• Procedures
	  ○ Form system
	  ○ Concrete placement
	  ○ Temporary tread protection
	• Schedule
	  ○ Sub-trades

3. Calculate concrete stairs	• Rise and run • Stairwell opening • Concrete volume • Components
4. Construct concrete stairs	• Layout • Assembly • Alignment • Form removal

Achievement Criteria

Performance	The learner will build multi-flight concrete stair forms.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code • Layout • Use of forms and hardware • Plumb and level • Dimensionally accurate, straight and square

Line (GAC): G CONCRETE FORMWORK

Competency: G8 Install Specialized Formwork

Objectives

To be competent in this area, the individual must be able to:

- Describe pre-cast concrete.
- Describe tilt-up construction.
- Describe pre-stressed concrete.
- Describe slip-forming.
- Describe mass concrete.
- Describe architectural formwork.
- Lay out for the installation of pre-cast, concrete components.

LEARNING TASKS	CONTENT
1. Describe tilt-up construction	• Safety • Uses • Drawings • Formwork • Lifting sequence • Lifting and bracing procedures
2. Describe pre-cast concrete	• Purpose • Types • Order of assembly • Handling and storage • Construction methods
3. Describe pre-stressed concrete	• Pre-tensioning • Post-tensioning
4. Describe slip-form construction	• Planning • Types • Construction procedures • Jacks and yokes • Concrete placement • Concrete finishing • Dismantling procedures
5. Describe mass concrete	• Heat of hydration • Types • Placement methods

LEARNING TASKS	CONTENT

6. Describe architectural formwork	• Purpose
	• Types
	  ○ Curved walls
	  ○ Arches
	  ○ Floors
	  ○ Walls
	  ○ Ceilings
	  ○ Landscape features
	  ○ Rustications

7. Describe sealing joints	• Types of caulking compounds • Backer rods • Sealers and primers • Procedures
8. Lay out tilt-up construction	• Construction drawings • Locations of hardware and accessories

Achievement Criteria

Performance	The learner will lay out for the installation of pre-cast, concrete components.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Location of components

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H6 Build Roof Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe hip roofs.
- Build a hip roof.
- Describe intersecting roofs.
- Build an intersecting roof.

LEARNING TASKS	CONTENT
1. Describe hip roof systems	• Purpose • Uses • Types • Components
2. Plan hip roof systems	• Safety • Code requirements • Construction drawings • Construction sequence
3. Calculate hip roof systems	• Theoretical lengths • Materials
4. Build hip roof systems	• Lay out • Cut • Assemble
5. Describe an intersecting roof	• Purpose • Uses • Types • Components
6. Plan an intersecting roof	• Safety • Code requirements • Drawings and specifications • Construction sequence
7. Calculate an intersecting roof	• Theoretical lengths • Materials

8. Build an intersecting roof
   - Lay out
   - Cut
   - Assemble

Achievement Criteria

Performance	The learner will build an intersecting hip roof.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code • Calculation, layout and spacing of rafters and roof framing members • Dimensionally accurate, straight and square • Accuracy of cuts

Line (GAC): I FINISHING MATERIALS

Competency: I2 Install Doors and Hardware

Objectives

To be competent in this area, the individual must be able to:

- Describe interior doors.
- Install interior doors.

LEARNING TASKS	CONTENT
1. Describe interior doors	• Types • Construction • Purpose • Terminology • Code requirements • Security • Storage during construction • Swing/hand of door
2. Describe specialty interior doors	• Types • Purpose • Installation
3. Describe interior door jambs	• Types • Purpose • Construction
4. Describe interior door hardware	• Types • Purpose • Storage
5. Install interior doors	• Rough openings • Hanging and fitting
6. Install interior door hardware	• Types • Operation • Fitting • Templates

Achievement Criteria 1

Performance	The learner will hang and install an interior door.
Conditions	The learner will be given: • Construction drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Adherence to Code • Installation of door to specified tolerances • Installation of hardware

Achievement Criteria 2

Performance	The learner will use templates to layout door closers and panic hardware.
Conditions	The learner will be given: • Manufacturers' specifications • Materials
Criteria	The learner will be evaluated on: • Proper layout of hardware

Line (GAC): I FINISHING MATERIALS

Competency: I5 Install Interior Finishes

Objectives

To be competent in this area, the individual must be able to:

- Describe gypsum wallboard installation.

LEARNING TASKS	CONTENT
1. Describe gypsum wallboard	• Types • Purpose • Components • Tools • Installation`
2. Plan installation of gypsum wallboard	• Safety • Code requirements • Temporary protection
3. Calculate materials	• Gypsum wallboard • Components

Line (GAC): I FINISHING MATERIALS

Competency: I6 Install Cabinets

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction and installation of cabinets, countertops and hardware.
- Construct cabinets.

LEARNING TASKS	CONTENT
1. Describe cabinets	• Types • Components • Construction methods • Finishes
2. Describe countertops	• Types • Construction methods
3. Plan the building of cabinets and countertops	• Safety • Drawings and specifications ○ Shop drawings • Calculation of materials • Fixture locations • Sequence of installation • Temporary protection • Delivery • Storage
4. Build cabinets	• Material breakout • Layout • Cut • Assembly
5. Plan the installation of prefinished cabinets and countertops	• Safety • Code requirements • Installation methods • Components • Temporary protection
6. Install countertops	• Techniques

Achievement Criteria

Performance	The learner will build a cabinet.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool and equipment use • Dimensioning • Fit and finish • Installation of hardware

Line (GAC): I FINISHING MATERIALS

Competency: I7 Install Interior Floor, Ceiling and Wall Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe interior systems.
- Install steel stud walls and partitions.
- Install suspended ceilings.

LEARNING TASKS	CONTENT
1. Describe steel stud systems	• Types • Purpose • Tools • Components
2. Plan installation of steel stud systems	• Safety • Code requirements • Construction drawings
3. Install steel studs	• Lay out • Cut • Assemble
4. Describe demountable partitions	• Types • Components ○ Tamper-resistant fasteners • Installation
5. Describe interior ceiling systems	• Purpose • Types • Components • Methods
6. Plan installation of interior ceiling systems	• Safety • Code requirements • Construction drawings • Reflected ceiling plans
7. Calculate materials	• Wall systems • Ceiling systems

8. Install interior ceiling systems
   - Lay out
   - Cut
   - Assembly

Achievement Criteria 1

Performance	The learner will build steel stud walls with openings.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Plumb and square • Cutting and fastening technique • Dimensional accuracy

Achievement Criteria 2

Performance	The learner will build a suspended ceiling.
Conditions	The learner will be given: • Reflected ceiling plan
Criteria	The learner will be evaluated on: • Safety • Tool use • Layout • Level and square • Accurate dimensioning • Installation technique

Level 4

Carpenter

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B2 Interpret Building Codes and Bylaws

Objectives

To be competent in this area, the individual must be able to:

- Interpret building codes and bylaws.

LEARNING TASKS	CONTENT

1. Interpret building codes and bylaws	• Geometric stairs
	• Wall systems
	  ○ Sound transmission classification
	  ○ Fire separations
	  ○ Air, vapour and insulated assemblies

Achievement Criteria 1

Performance	The learner will interpret information from the building code.
Conditions	The learner will be given: • Assignment sheet
Criteria	The learner will be evaluated on: • Interpretation of building code

Achievement Criteria 2

Performance	The learner will complete documents for a building permit application.
Conditions	The learner will be given: • Municipal bylaws and regulations • Construction drawings and specifications
Criteria	The learner will be evaluated on: • Interpretation of bylaws, regulations, and permit processes

Line (GAC): B DOCUMENTATION AND ORGANIZATIONAL SKILLS

Competency: B3 Plan and Organize Work

Objectives

To be competent in this area, the individual must be able to:

- Describe contract documents.
- Use construction specifications.
- Use plans and drawings.
- Estimate costs from construction drawings.

LEARNING TASKS	CONTENT
1. Describe contract documents	• Types • Articles of agreement • Definitions • General conditions • Supplementary conditions • General requirements • Specifications • Drawings • Addenda
2. Describe the bidding process	• Invitation to tender • Instruction to bidders • Tender form
3. Describe estimating	• Rough estimate • Detailed estimate • Partial estimate • Sub trades • Quote pricing • Target pricing • Cost plus pricing • Unit pricing • Change orders • Allowances

4. Describe financial considerations	• Payment schedule • Bonds • Liens • Penalties/bonuses • Contingency funds
5. Plan work sequence	• Construction sequence • Material delivery sequence • Coordination with sub-trades • Time estimates
6. Estimate the cost of a job	• Labour • Material • Equipment • Subtrades • Overheads • Profit margin

7. Describe inspections for engineered applications	• Architectural
	  ○ Work completed
	  ○ Quality of work
	• Engineering
	  ○ Geotechnical
	  ○ Formwork
	  ○ Reinforcing steel
	  ○ Embedded materials
	  ○ Concrete
	• Municipal/Provincial
	  ○ Plumbing
	  ○ Electrical
	  ○ Fire
	  ○ Gas
	  ○ Final/occupancy
	  ○ Elevator
	  ○ Health

Achievement Criteria

Performance	The learner will estimate and schedule a project.
Conditions	The learner will be given: • Drawings and specifications • Cost guides
Criteria	The learner will be evaluated on: • Project schedule • Documentation • Accuracy

Line (GAC): D SURVEY INSTRUMENTS AND EQUIPMENT

Competency: D2 Use Site Layout Equipment

Objectives

To be competent in this area, the individual must be able to:

- Describe total stations.

LEARNING TASKS	CONTENT
1. Describe total stations	• Calculations • Set-up • Adjustment • Readings • Layout • Maintenance • Storage
2. Calculate layout of curves	• Types • Chord lengths • Arc lengths • Offsets

Achievement Criteria

Performance	The learner will lay out curved shapes.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Calculations and layout • Accuracy

Line (GAC): F SITE LAYOUT

Competency: F2 Prepare Building Site

Objectives

To be competent in this area, the individual must be able to:

- Describe site considerations.
- Describe site preparation.
- Describe hoarding.
- Describe pre-excavation preparation.
- Describe drainage systems.
- Describe backfilling.

LEARNING TASKS	CONTENT

1. Describe site considerations	• Building location
	• Temporary facilities
	  ○ First Aid
	  ○ Tool storage
	  ○ Site offices
	  ○ Fuel storage
	  ○ Muster station
	  ○ Parking
	  ○ Wheel wash
	  ○ Sediment control
	• Temporary services
	• Water
	• Gas
	• Electrical
	• Material lay down services
	• Delivery areas
	• Temporary road ways
	• Demobilization

LEARNING TASKS	CONTENT
2. Describe site and project preparation	• Site layout • Permits • Environmental plan • Clearing the site • Tree protection • Sediment and erosion control • Geotechnical reports • BC One Call • Weather considerations • Identify and remove hazardous materials • Site services • Dump site
3. Describe hoardings	• Building codes and bylaws • Methods of construction • Types • Access lighting and signage

4. Describe site drainage systems	• Types
	  ○ Dewatering system
	  ○ Perimeter draining systems
	  ○ Granular drainage layer systems
	  ○ Drainage disposal
	  ○ Sumps

5. Describe pre-excavation preparation	• Environmental impact assessment • Planning • Locate services • Disconnect services • Building elevations • Demolition • Access to site • Location of temporary buildings • Location of excavated materials • Build hoardings and barricades • Location of building materials

LEARNING TASKS	CONTENT
6. Describe sumps, catch basins and septic tanks	• Code regulations • De-watering systems • Sumps • Trapping hoods • Storm drains • Sanitary sewer • Catch basins • Backwater valves • Septic tanks • Perimeter drains

7. Describe backfilling	• Safety
	• Code requirements
	• Procedures
	  ○ Backfilling concrete foundations
	  ○ Backfilling preserved wood foundations
	  ○ Backfilling service trenches
	• Foundation protection
	• Water/damp proofing

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H5 Build Stair Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe geometric stairs.
- Build geometric stairs.
- Build balustrades.

LEARNING TASKS	CONTENT
1. Describe stairs with winders	• Stringer types • Tread shapes
2. Plan stairs with winders	• Safety • Code requirements • Stringer types
3. Calculate stairs with winders	• Rise and run • Stairwell openings • Stair dimensions • Materials
4. Build stairs with winders	• Layout • Cut • Assembly
5. Describe circular stairs	• Purpose • Types • Components
6. Plan circular stairs	• Safety • Code requirements • Stringer types
7. Calculate circular stairs	• Rise and run • Stairwell openings • Stair dimensions • Materials

8. Build circular stairs
   - Layout
   - Cut
   - Assembly

Achievement Criteria 1

Performance	The learner will build winder stairs.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code • Calculations, layout and cuts • Dimensionally accurate, straight, square and plumb • Fit and finish

Achievement Criteria 2

Performance	The learner will build circular stairs.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code • Calculations, layout and cuts • Dimensionally accurate, straight, square and plumb • Use of templates and jigs • Assembly techniques • Fit and finish

Achievement Criteria 3

Performance	The learner will build a balustrade.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code • Calculations, layout and cuts • Dimensionally accurate, straight, square and plumb • Fit and finish

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H6 Build Roof Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction methods for unequal slope intersecting roofs.
- Build unequal slope intersecting roofs.

LEARNING TASKS	CONTENT
1. Describe an unequal slope intersecting roof	• Purpose • Uses • Types • Components
2. Plan an unequal slope intersecting roof	• Safety • Code requirements • Drawings and specifications • Construction sequence
3. Calculate an unequal slope intersecting roof	• Theoretical lengths • Materials
4. Build an unequal slope intersecting roof	• Layout • Cut • Assembly

Achievement Criteria

Performance	The learner will build an unequal slope intersecting roof.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Compliance with Code • Drawing for adjustments • Accuracy

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H7 Build Specialized Framing Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe specialized framing systems.
- Build specialized framing systems.

LEARNING TASKS	CONTENT
1. Describe specialized framing systems	• Types • Bay windows • Bow windows • Window boxes • Drop ceiling • Valences • Pony walls • Bulkheads • Cornices • Access floors • Purpose • Styles

2. Describe specialized roof systems	• Types
	  ○ Polygon roofs
	  ○ Gambrel
	  ○ Mansard
	  ○ Flat
	  ○ Dormer
	  ○ Cupola
	  ○ Turret
	  ○ Canopy
	  ○ Spire
	  ○ Saw tooth
	  ○ Butterfly roof
	• Components
	  ○ False gable
	  ○ Cricket/saddle
	  ○ Parapet
	  ○ Cant strip
	  ○ Hidden gutters

	• Methods of construction
	  ○ Openings
	  ○ Wall frame
	  ○ Roof frame
	  ○ Curbs
	  ○ Vaulted ceilings

3. Plan specialized framing systems	• Safety • Code requirements • Scale drawing • Construction sequence
4. Calculate specialized framing systems	• Theoretical lengths • Materials
5. Build specialized framing systems	• Layout • Cut • Assembly

Achievement Criteria

Performance	The learner will build a specialized framing, such as polygon roofs, bay windows, or dormers.
Conditions	The learner will be given: • Drawings and specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Accuracy • Framing technique

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H8 Perform Renovations and Additions

Objectives

To be competent in this area, the individual must be able to:

- Describe renovations and additions.

LEARNING TASKS	CONTENT
1. Describe renovations and additions	• Purpose • Types • Design considerations

2. Plan renovations and additions	• Safety
	• Code requirements
	• Permits
	• Hoarding
	• Drawings and specifications
	• Sequence
	• Demolition
	  ○ Temporary support
	  ○ Services
	  ○ Protect finishes
	  ○ Housekeeping
	  ○ Disposal
	• Hazardous materials
	  ○ Asbestos
	  ○ Mold
	  ○ Lead
	  ○ Mercury
	  ○ PCB
	  ○ Infestation
	  ○ Biohazards
	  ○ Silica
	  ○ Dust
	• Reclaim material

3. Describe methods of renovations and additions	• Select materials
	• Support existing structure
	• Connecting structural components
	  ○ Concrete-to-concrete
	  ○ Wood-to-wood
	  ○ Wood-to-steel
	• Removal of temporary supports and hoardings
	• Install finishes

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H9 Build Timber and Engineered Wood Construction

Objectives

To be competent in this area, the individual must be able to:

- Describe timber and engineered wood construction.

LEARNING TASKS	CONTENT

1. Describe timber construction	• Purpose
	• Types
	  ○ Traditional post and beam
	  ○ Heavy timber
	  ○ Engineered
	  ○ Logs
	  ○ Cross-laminated timber (CLT)
	• Uses
	• Hardware
	• Tools
	• Connections

Line (GAC): H WOOD FRAME CONSTRUCTION

Competency: H10 Build Decks and Exterior Structures

Objectives

To be competent in this area, the individual must be able to:

- Describe exterior structures.
- Plan exterior structures.

LEARNING TASKS	CONTENT

1. Describe exterior structures	• Purpose
	• Types
	  ○ Fences
	  ○ Pergola
	  ○ Gazebos
	  ○ Privacy screens
	  ○ Accessory buildings
	• Components
	• Methods

2. Plan exterior structures	• Safety • Code requirements • Drawings and specifications • Sequence

Line (GAC): I FINISHING MATERIALS

Competency: I5 Install Interior Finishes

Objectives

To be competent in this area, the individual must be able to:

- Describe finished floors.
- Describe interior wall finishes and trims.
- Install interior wall finishes and trims.

LEARNING TASKS	CONTENT
1. Describe finished floors	• Types
2. Plan the installation of finished floors	• Safety • Code requirements • Material calculations • Storage and handling • Acclimatization • Subfloor preparation • Installation of sleepers • Layout procedures • Fasteners • Adhesives • Sanding/finishing
3. Describe interior finishes	• Types • Components • Materials
4. Plan interior finishes	• Safety • Code requirements • Drawings and specifications • Calculations • Sequence • Temporary protection
5. Install interior finishes	• Layout • Cut • Assembly

Achievement Criteria 1

Performance	The learner will scribe fit paneling.
Conditions	The learner will be given: • Specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Fit

Achievement Criteria 2

Performance	The learner will install casing and crown moulding.
Conditions	The learner will be given: • Specifications
Criteria	The learner will be evaluated on: • Safety • Tool use • Fit and finish

Line (GAC): I FINISHING MATERIALS

Competency: I7 Install Interior Floor, Ceiling and Wall Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe specialized floor systems.

LEARNING TASKS	CONTENT
1. Describe specialized floor systems	• Access flooring • Sports surfaces

Line (GAC): J BUILDING SCIENCE

Competency: J1 Control the Forces Acting on a Building

Objectives

To be competent in this area, the individual must be able to:

- Describe the forces acting on a building.
- Describe the construction details for wood frame seismic applications.
- Determine construction practices based on design loads and bearing capacities of soils.

LEARNING TASKS	CONTENT
1. Describe forces acting on the building structure	• Types of loads • Types of stress • Bearing capacities of soil
2. Describe forces acting on the building envelope	• Weather/climate • Temperature • Wind • Water • Building orientation • Ultra violet radiation/sun • Relative humidity • Hydrostatic forces • Atmospheric pressure • Pressure differential

3. Describe seismic applications	• Code requirements
	  ○ Brace wall panels
	  ○ Brace wall bands
	  ○ Sheathing types
	  ○ Nailing patterns
	  ○ Nail types
	  ○ Blocking and backing
	  ○ Bracing
	  ○ Floor diaphragms

4. Describe seismic hardware and steel frames	• Hold down anchors • Straps • Bolts • Nails • Drag struts • Steel moment frames
5. Describe live and dead load calculation	• Tributary area • Soil bearing capacities • Footing sizes

Section 4

TRAINING PROVIDER STANDARDS

Facility Requirements

Classroom Area

- Comfortable seating and tables suitable for learning
- Compliance with the local and national fire code and occupational safety requirements
- Overhead and multimedia projectors with a projection screen
- Whiteboard with marking pens and erasers, or chalkboard with chalk and erasers
- Lighting controls to allow easy visibility of the projection screen while allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- In-room temperature control to ensure comfortable room temperature
- Acoustics in the room must allow audibility of the instructor
- Access to a computer lab complete with 16 computers and internet access
- Access to a library complete with reference material for student and instructor use

Shop Area

- 2,400 square feet of workshop space per class of 16 students with a minimum ceiling height of 16 feet
  - This includes space for a tool crib
- Adequate lighting and lighting control
- Ventilation as per WorkSafeBC Standards
- Refuse and recycling bins for used shop materials
- First-aid facilities

Lab Requirements

- N/A

Student Facilities

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

Instructor's Office Space

- Desk and filing space
- Computer

Tools and Equipment

Shop Equipment

Required

All Levels:

Standard Safety Equipment

- Eye protection
- Fall protection systems
- First aid kit
- Foot protection
- Hand protection
- Hard hat (head protection)
- Hearing protection
- Lung protection
- Reflective vest

Stationary Equipment

- Dust collection equipment

Level-Specific:

Survey Instruments

1	Optical levels	2	Theodolite

Rigging and Hoisting Equipment

1	Chokers	1	Ropes
1	Come-alongs	1	Skid ramps
1	Eyebolts	1	Tirfors
1	Nylon lifting straps	1	Turnbuckles
1	Pinch bar		

Stationary Equipment

3	Band saw	2	Sanders
1	Bench grinder	1	Table saw
3	Drill press	2	Thickness planer
2	Jointer		

Shop (Facility) Tools

Standard Tools

All Levels:

Hand tools

- Adjustable wrench
- Allen wrenches
- Chalk line
- Clamps
- Combination square
- Cordless drill
- Dry line
- Framing square
- Hammers (framing, finishing)
- Hand saws
- High speed drill set
- Knives
- Levels
- Measuring tape
- Nail puller
- Nail set
- Pencil/marking instrument
- Pliers and side cutter
- Plumb bob
- Pry bars
- Scale rulers
- Screwdrivers (Robertson, Phillips, straight)
- Sliding T-bevel square
- Speed square
- Stair gauges
- Try square
- Wrecking bar

Portable Power Tools and Portable Equipment

- Calculator
- Circular saw
- Cordless drill and bits
- Electric drill
- Extension cords
- Grinder
- Ladders
- Mitre saw
- Portable power tool accessories
- Power nailer/fastener
- Reciprocating saw
- Step ladders
- Wet/dry vacuum
- Wheelbarrow

Level-Specific:

Hand tools

1,3	Angle divider	1,3	Plane (compass)
1	Aviation snips	1,3	Plane (fore)
1	Back saw	1,3	Plane (jack)
2,3	Butt gauge	1,3	Plane (jointer)
2,3,4	Caulking gun	1,3	Plane (rabbet)
1	Circle cutter	1,3	Plane (router)
1,3	Concrete bits	1,3	Plane (smooth)
3	Cone/tie wrench	1,3	Plane (universal)
3	Coping saw	1,3	Putty knife
3	Dividers	1,3	Rasp
3	Drywall T-square	1,3	Scriber
1	File	1,3	Scribing compass
1	Hack saw	1,3	Set of chisels
2	Hand shears	1,2	Stapler
2,3	Hinge gain template	1,3	Stones (oil and water)
3	Hole saw	1,2	Tape measure 100 ft.
3	“J” rollers	3	Trammel points
3	Keyhole saw	1,3	Wood boring bits
3	Laminate knives	1,3	Wood chisels
1,3	Plane (bench)	1,3	Wood spade bit set
1,3	Plane (block)		

Portable Power Tools and Portable Equipment

1	Air compressor	1	Ladder jacks
2	Belt sander	3	Laminate trimmer
2	Biscuit joiner	2	Oxy-fuel outlet
3	Concrete cutting saw	2	Palm sander
3	Concrete vibrator	2	Planer
3	Construction heaters	1	Pneumatic tools
3	Cut-off saw	1,3	Powder actuated tools
3	Drywall gun	1,2	Roof jack
3	Electric chipping hammer	2	Router and bits
1	Generator	2	Sander
3	Grinder	1	Scaffold
3	Hammer drill	3	Stapler
3	Jackhammer	1	Wall jack
1	Jigsaw		

Student Tools (supplied by student)

Required

- Contact training facility for required tools and equipment

Recommended

- Steel toed boots
- Safety glasses
- Scientific calculator with trigonometry functions
- Weather appropriate clothing
- Carpenter's apron
- Hammer
- Metric and imperial tape measures
- Drafting supplies – drawing pencils, metric and imperial scales, T-square, set-squares, geometry set
- Squares
- Knives
- Hard Hat
- Gloves

Reference Materials

Required Reference Materials

- Contact training facility for required reference material

Level 1:

- **Carpenter Apprenticeship Program: Year 1: (2 Binder Set) – BC Trade Modules** (www.crownpub.bc.ca)
- Carpentry: Third Canadian Edition by Floyd Vogt and Michael Nauth
- British Columbia Building Code

Level 2:

- **Carpenter Apprenticeship Program: Year 2: (2 Binder Set) – BC Trade Modules** (www.crownpub.bc.ca)
- Carpentry: Third Canadian Edition by Floyd Vogt and Michael Nauth
- British Columbia Building Code

Level 3:

- **Carpenter Apprenticeship Program: Year 3: (2 Binder Set) – BC Trade Modules** (www.crownpub.bc.ca)
- Carpentry: Third Canadian Edition by Floyd Vogt and Michael Nauth
- British Columbia Building Code

Level 4:

- **Carpenter Apprenticeship Program: Year 4: (2 Binder Set) – BC Trade Modules** (www.crownpub.bc.ca)
- Carpentry: Third Canadian Edition by Floyd Vogt and Michael Nauth
- British Columbia Building Code

Recommended Resources

- *Occupational Health & Safety Regulation*, Worker's Compensation Board (1989) ISBN 0-8269-0403-3

All carpenters in British Columbia are required to use and adhere to this regulation. The OHS Regulation is always changing to meet the needs of the construction industry. Use the WorkSafeBC website to keep up-to-date with changes to the regulation and to be informed of new workplace hazards. www.worksafebc.com

- *Concrete Formwork* by Leonard Koel, 4th Edition ISBN 9780826907103
- *Principles and Practices of Commercial Concrete*
- *Understanding Construction Drawings* Tom Stephenson
- Workplace Hazardous Materials Information System (WHMIS) and First Aid, http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/index-eng.php
- WorkSafeBC, www.worksafebc.com

Codes

- National Fire Code of Canada http://www.nrc-cnrc.gc.ca
- BC Ministry of Housing http://www.gov.bc.ca/buildingcodes Queen's Printer for BC Code books
  - BC Building Code
  - BC Fire Code
  - BC Electrical Code
- National Fire Protection Association www.nfpa.org
  - NFPA 80 – Standards for Fire Doors and Fire Windows
  - NFPA 101 – Life Safety Code
- Canadian National Building Code http://www.nrc-cnrc.gc.ca

Suggested Texts

- *Building Trades Blueprint Reading* Sandberg – Copp Clark (1982)
  ISBN 0-7730-2900-1

This text is suggested to complete the technical training component of the carpentry apprenticeship program. It describes blueprint-reading techniques for the construction of residential buildings. Available online at: https://www.amazon.ca/Building-Trades-Blueprint-Reading-Residential/dp/0773029001

- *Principles and Practices of Commercial Construction, 9th Edition* Smith – Prentice-Hall (2000)
  ISBN 0-13-026162-9

This text is suggested to complete the technical training component of the carpentry apprenticeship program. It covers construction techniques for the construction of large buildings. Available online at: https://www.pearsonhighered.com/program/Andres-Principles-Practices-of-Commercial-Construction-9th-Edition/PGM223960.html

- *Building Trades Dictionary 4th Edition* Toenjes – American Technical Publishers (1989)
  ISBN-13: 978-0-8269-0406-5

The Building Trades Dictionary explains the meaning of many construction terms. The text makes good use of diagrams. It is useful as an auxiliary reference text that may be available at the public library. CD Rom is available. Available online at: http://www.atplearning.com/Building-Trades-Dictionary-P41.aspx

- *Practical Problems in Mathematics For Carpenters* Huth – Delmar (1991)
  ISBN 0-8273-4579-8

Harry Huth, the author of this text, uses many diagrams and sample problems to lead the learner through the methods used to solve carpentry related math problems. The text is useful as an auxiliary reference text that may be available at the public library. Available online at: http://www.amazon.com/Practical-Problems-Mathematics-Carpenters-Series/dp/1111313423

- *Permanent Wood Foundations* Canadian Wood Council (1992)
  ISBN 0-921628-19-6

The Canadian Wood Council publishes this text. It includes many diagrams and does an excellent job of describing wood foundations. It is useful as an auxiliary reference text that may be available at the public library. Available online at: https://webstore.cwc.ca/technical-books/pwf001e-permanent-wood-foundations

- *Formwork for Concrete* Hurd – American Concrete Institute SP-4 (1989)
  LCC 89-81442

Formwork for Concrete, Principals and Practices of Commercial Construction is the definitive text on the construction of formwork. The explanations and diagrams are excellent. It is useful as an auxiliary reference text that may be available at the public library.
Available online at: http://www.amazon.com/Formwork-Concrete-ACI-SP4-M-K-Hurd/dp/B0034W2LVW

- *Concrete Technology* White – Delmar (1991)
  ISBN 0-8273-3635-7

Concrete Technology is a simplified version of Design and Control of Concrete Mixtures. It is useful as an auxiliary reference text that may be available at the public library. Available online at: http://www.amazon.com/Concrete-Technology-Trade-Industry/dp/0827336357

- *Hand Woodworking Tools* McDonnell – Delmar (1978)
  ISBN 0-8273-1098-6

Hand Woodworking Tools gives a wonderful description of the traditional hand woodworking tools used in carpentry. It is an older text that may be out of print but is listed here because of the quality of the diagrams used in the text. It is useful as an auxiliary reference text that may be available at the public library. Available online at: http://www.abebooks.com/servlet/BookDetailsPL?bi=11800428479&cm_sp=seedet-_-plp-_-bdp

- *Design and Control of Concrete Mixtures, 8th Canadian Edition* ISBN-13: 978-0893122720

*The Design and Contro*l of Concrete Mixtures gives a thorough description of the components of concrete and how they work together. It is useful as an auxiliary reference text that may be available at the public library. Available online at: http://www.cement.org/for-concrete-books-learning/concrete-technology/concrete-design-production/design-and-control-mixtures-landing-page

- *Understanding Wood* Hoadley – Taunton Press (2005)
  ISBN 978-1-56158-358-4

Understanding Wood is a very well written text on the properties of wood. It describes how the properties of wood can be predicted and controlled. It is useful as an auxiliary reference text that may be available at the public library. Available online at: http://www.tauntonstore.com/understanding-wood-2nd-edition-r-bruce-hoadley-070490.html

- *Canadian Woodframe House Construction, CMHC, Revised 2013*

The Central Mortgage and Housing Corporation (CMHC) publish this useful book. It describes all aspects of wood frame construction. It is useful as an auxiliary reference text that may be available at the public library and is also available on CD-ROM. It is available for free download on the CMHC website. Available online at: https://www03.cmhc-schl.gc.ca/catalog/productDetail.cfm?cat=178&itm=1&lang=en&sid=gp9iTS

- *National Building Code of Canada*

The National Building Code (NBC) is the main building regulation text for Canada. Local Building Codes are based on this text. When working in British Columbia, it is useful to be aware of the difference between the BC Code and the NBC. This text is available at public libraries and at the college library and is also available on CD-ROM. Available online at: http://www.nrc-cnrc.gc.ca/eng/solutions/advisory/codes_centre_index.html

- *Construction Materials, Methods and Techniques* William P. Spence, Eva Kultermann (2016)

This text does an excellent job of describing the properties of construction materials. It is useful as an auxiliary reference text that may be available at the public library or at the college library. Available online at: https://www.amazon.ca/Construction-Materials-Methods-Techniques-Sustainable/dp/1435481089

- *Why Buildings Stand Up* Salvadori, Norton Publishing (2002)
  ISBN 978-0-393-30676-7

Why Buildings Stand Up does a great job of describing the physics of building construction. It uses many historical references and truly simplifies the forces acting on a building. It is useful as an auxiliary reference text that may be available at the public library or at the college library. Available online at: http://books.wwnorton.com/books/978-0-393-30676-7/

- *Architectural and Graphic Standards, Student Edition* Charles George Ramsey, Harold, Reeve, Sleeper, Bruce Bassler (Editor)
  American Institute of Architects (2008)
  ISBN 0-471-04683-3

The construction details shown in this text are wonderful. Both residential and commercial construction details are shown. It is useful as an auxiliary reference text that may be available at the public library or at the college library. Available online at: https://www.amazon.ca/Architectural-Graphic-Standards-Student-Edition/dp/0470085460

- *Hoisting and Rigging Safety Manual*

The Ontario Safety Association published this manual. It provides a good description of safe rigging practices. It is useful as an auxiliary reference text that may be available at the public library or at the college library. Available online at: http://www.oetio.com/Hoisting_and_Rigging_Safety_Manual.aspx

- *De Walt Carpentry and Framing* ISBN 13:978-1-1111361-3-0

De Walt Carpentry and Framing handbook spells out, through pictures, the step-by-step procedures associated with key carpentry concepts. The accompanying text is clear, straightforward, and accessible, clarifying and elaborating on the visuals. Coverage begins with a discussion of house types and foundations, gradually progressing to more complex areas, such as wall and floor framing. Available online at: http://www.amazon.com/gp/product/1111136130/ref=pd_lpo_sbs_dp_ss_1?pf_rd_p=1944687522&pf_rd_s=lpo-top-stripe-1&pf_rd_t=201&pf_rd_i=1111313423&pf_rd_m=ATVPDKIKX0DER&pf_rd_r=1XXXKR46T155ATRSSY32

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.

Instructor Requirements

Occupation Qualification

The instructor must possess one of the following:

- Carpenter Certificate of Qualification from British Columbia, preferably with an Interprovincial Red Seal Endorsement
- Carpenter Certificate of Qualification from another Canadian jurisdiction, complete with the Interprovincial Red Seal Endorsement

Work Experience

- A minimum of 5 years' experience working in the industry as a journeyperson.

Instructional Experience and Education

It is preferred that the instructor also possesses one of the following:

- An Instructors Diploma or equivalent
- A Bachelor's Degree in Education
- A Master's Degree in Education

Appendices

Appendix A

Assessment Guidelines

Appendix A
Assessment Guidelines

Program: **Carpenter**

Training providers delivering Carpenter apprenticeship in-school technical training are required to enter the following information in SkilledTradesBC Portal for each apprentice:

- An in-school mark in the form of a percentage

Training Provider Component: **In-School Technical Training**

The in-school mark for each level is derived from a combination of theory and practical assessments. This mark is then combined with the SkilledTradesBC Standard Level Examination to determine a final mark for the level.

Calculation tables showing the subject competencies, level percentage weightings and level examination weightings are shown in the Grading Sheet: "Subject Competencies and Weightings" section of this document.

Carpenter Level 1, 2 & 3 in-school marks are calculated by:

- Totaling the level *theory* competency results as noted in the competencies and weightings tables and multiplying the total by 50% for Level 1, 2 & 3 to produce a weighted theory result;
- Totaling the level *practical* competency results as noted in the competencies and weightings tables and multiplying the total by 50% for Level 1, 2 & 3 to produce a weighted practical result;
- Adding the theory and practical competency results together to determine the final in-school result.

Successful completion of the in-school training for each level is defined as an in-school mark of 70% or greater.

SkilledTradesBC Component: **SkilledTradesBC Standardized Level Examinations - Level 1, 2 & 3**

SkilledTradesBC Portal automatically calculates the final mark for a level once the in-school training and standard level exam marks are entered into the system. This mark is calculated by blending the standardized exam percentage score and the in-school technical training percentage score to determine the final mark for the level.

In-school technical training (combined theory & practical) is weighted at 80% and the SkilledTradesBC standardized level exam is weighted at 20%. These two scores are combined to determine the final level mark. This result is the final mark that is recorded in SkilledTradesBC Portal.

- A mark of 70% or greater is required to pass the level when combining the final in-school percentage score and the final SkilledTradesBC standardized level exam percentage score.

Component: **Level 4 - Proprietary Examinations**

Until further notice, Training Providers delivering the Carpenter program will continue using their institution's proprietary examination in the calculation of the apprentices' achievement for Level 4. The percentage weighting of this exam is 30% of the final in-school technical training mark.

Refer to the Grading Sheet Subject Competencies and Weightings Table to determine the calculation process for completing a final Level 4 percentage. The final blended mark for Level 4 is to be reported to SkilledTradesBC and must be 70% or greater to pass the level.

Interprovincial Red Seal Exam

In order to achieve certification, Carpenter apprentices are required to write the Carpenter Interprovincial Red Seal exam after completing all levels of in-school technical training. Apprentices must have passed all levels of in-school technical training or be approved challengers to sit the exam. A score of 70% or greater is required for a pass.

Interprovincial Red Seal exams should be requested by training providers via the usual SkilledTradesBC procedure.

The SkilledTradesBC will administer and invigilate Interprovincial Red Seal exams and score and record exam results in SkilledTradesBC Portal.

Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:	CARPENTER LEVEL 1

LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
A	SAFE WORK PRACTICES	6%	3%
B	DOCUMENTATION AND ORGANIZATIONAL SKILLS	16%	12%
C	TOOLS AND EQUIPMENT	17%	16%
D	SURVEY INSTRUMENTS AND EQUIPMENT	6%	6%
E	ACCESS, RIGGING AND HOISTING EQUIPMENT	15%	15%
F	SITE LAYOUT	2%	3%
G	CONCRETE FORMWORK	20%	30%
H	WOOD FRAME CONSTRUCTION	16%	15%
J	BUILDING SCIENCE	2%	0%
	Total	100%	100%
Calculated by the Training Provider (Carpenter in-school theory & practical subject competency weighting)		50%	50%
Training Provider enters final in-school mark into SkilledTradesBC Portal		IN-SCHOOL %	

Calculated by SkilledTradesBC: In-school Mark SkilledTradesBC Portal calculates the percentage weighting once the in-school mark is entered. Combined theory and practical subject competency multiplied by	80%
Calculated by SkilledTradesBC: Standard Level Exam Mark SkilledTradesBC Portal will calculate the percentage weighting once the standard level exam marks have been entered. The exam score is multiplied by	20%
Calculated by SkilledTradesBC: Final Mark The final mark for determining credit is calculated by SkilledTradesBC Portal.	FINAL%

PROGRAM: IN-SCHOOL TRAINING:	CARPENTER LEVEL 2

LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
B	DOCUMENTATION AND ORGANIZATIONAL SKILLS	13%	13%
C	TOOLS AND EQUIPMENT	10%	10%
D	SURVEY INSTRUMENTS AND EQUIPMENT	8%	9%
F	SITE LAYOUT	7%	7%
G	CONCRETE FORMWORK	10%	10%
H	WOOD FRAME CONSTRUCTION	20%	22%
I	FINISHING MATERIALS	25%	22%
J	BUILDING SCIENCE	7%	7%
	Total	100%	100%
Calculated by the Training Provider (Carpenter in-school theory & practical subject competency weighting)		50%	50%
Training Provider enters final in-school mark into SkilledTradesBC Portal		IN-SCHOOL %	

Calculated by SkilledTradesBC: In-school Mark SkilledTradesBC Portal calculates the percentage weighting once the in-school mark is entered. Combined theory and practical subject competency multiplied by	80%
Calculated by SkilledTradesBC: Standard Level Exam Mark SkilledTradesBC Portal will calculate the percentage weighting once the standard level exam marks have been entered. The exam score is multiplied by	20%
Calculated by SkilledTradesBC: Final Mark The final mark for determining credit is calculated by SkilledTradesBC Portal.	FINAL%

PROGRAM: IN-SCHOOL TRAINING:	CARPENTER LEVEL 3

LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
B	DOCUMENTATION AND ORGANIZATIONAL SKILLS	14%	14%
C	TOOLS AND EQUIPMENT	3%	8%
F	SITE LAYOUT	3%	0%
G	CONCRETE FORMWORK	30%	30%
H	WOOD FRAME CONSTRUCTION	20%	18%
I	FINISHING MATERIALS	30%	30%
	Total	100%	100%
Calculated by the Training Provider (Carpenter in-school theory & practical subject competency weighting)		50%	50%
Training Provider enters final in-school mark into SkilledTradesBC Portal		IN-SCHOOL %	

Calculated by SkilledTradesBC: In-school Mark SkilledTradesBC Portal calculates the percentage weighting once the in-school mark is entered. Combined theory and practical subject competency multiplied by	80%
Calculated by SkilledTradesBC: Standard Level Exam Mark SkilledTradesBC Portal will calculate the percentage weighting once the standard level exam marks have been entered. The exam score is multiplied by	20%
Calculated by SkilledTradesBC: Final Mark The final mark for determining credit is calculated by SkilledTradesBC Portal.	FINAL%

PROGRAM: IN-SCHOOL TRAINING:	CARPENTER LEVEL 4

LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
B	DOCUMENTATION AND ORGANIZATIONAL SKILLS	15%	20%
D	SURVEY INSTRUMENTS AND EQUIPMENT	10%	13%
F	SITE LAYOUT	8%	0%
H	WOOD FRAME CONSTRUCTION	55%	55%
I	FINISHING MATERIALS	10%	12%
J	BUILDING SCIENCE	2%	0%
	Total	100%	100%

Calculated by the Training Provider:		
Carpenter in-school theory & practical subject competency weighting	50%	50%
In-school Mark Combined theory and practical subject competency multiplied by	70%	
Proprietary Exam Mark The exam score is multiplied by	30%	
Training Provider enters final in-school mark into SkilledTradesBC Portal A score of 70% or greater is required for a pass.	FINAL %	

All apprentices who complete Level 4 of the Carpenter program with a FINAL level mark of 70% or greater will write the Interprovincial Red Seal examination as their final assessment.

SkilledTradesBC will enter the apprentices' Carpenter Interprovincial examination mark in SkilledTradesBC DA. A minimum mark of 70% on the examination is required for a pass.

Appendix B

Glossary

Appendix B Glossary

Adjust	To change something in a minor way so that it works better, such as changing the mitre angle on a compound mitre saw.
Build	To make something by putting together parts or materials; construct; erect. This includes layout and assembly techniques; cutting, fitting, fastening, and joinery.
Calculate	Determine the amount or number of something mathematically. Calculating includes all aspects of estimating labour and materials (where there is some overlap with planning), calculation of volumes, theory, lengths of rafters, rise and run of stairs, board foot measure, etc.
Consult	To ask for the professional opinion of someone or to talk with someone, or look up information in a document, in order to make a decision.
Construction Drawings and Specifications	Blueprints, plans, instructions, information
Correct	Having no errors or mistakes. Calculations should be done correctly.
Describe	To explain or give an account of an item or concept. This means an introduction to a topic area that will include terminology, safety as it pertains to the topic, types and uses of the item. For example, describing roofs will include terminology such as rise and run, slope, rafter, fascia; discussion regarding working at heights; types of roofs such as gable and hip.
Identify	Establish or indicate what something is. This is the most basic level of learning and typically precedes all others. In the case of a lengthy learning period (such as an apprenticeship), it is often adequate to identify a tool or procedure well in advance of actually describing and using the tool.
Install	To make ready to be used in a certain place, such as installing a door or window hardware.
Interpret	To explain or understand the meaning of something. This primarily means using construction drawings. Given the alphabet of lines and numerous symbols and formats, construction drawings are a language of their own. The carpenter must interpret two dimensional drawings to build three dimensional objects.
Layout	The way in which the parts of something are arranged or laid out. This is a fundamental aspect of a carpenter's role in the construction process and includes everything from use of surveying equipment to locate buildings on sites, to making scale drawings of complex joinery details such as intersecting unequal slope roof framing members. It is included in the Learning Tasks entitled 'Build' because it is often the first step in putting things together, but in some cases 'Layout' could be a separate Learning Task. A procedure or group of components must be correctly laid out in order for construction to proceed.

Maintain	To keep a tool in good condition by performing regular maintenance such as lubrication or cleaning, as well as making repairs and correcting problems.
Plan	An intention or decision about what one is going to do; to decide on and arrange in advance. Planning includes all aspects of reading and interpreting construction drawings and documentation; any reference to WorkSafeBC, building codes and bylaws; consultation with architects, engineers, sub trades, and owners occurs as part of planning. There is an overlap between planning and calculating, primarily in terms of estimating time and materials.
Prepare	To work out the details of or plan in advance; to make something ready for some activity or purpose, such as preparing the site for construction activities.
Proper	In a thorough manner; suitable for some purpose or situation. Tools are used properly.
Systems	A set of detailed methods, procedures and routines created to carry out a specific activity, perform a duty, or solve a problem. Typically, the use of the term systems refers to ICI construction. It is used to differentiate between ICI systems, such as proprietary forms or interior finishes, and common residential construction techniques.
Use	The act of using something. This typically involves the safe and proper operation of a tool or construction system. In the case of formwork systems, safe, proper and efficient use includes the ease of stripping the formwork.

Note: Additional industry terms are defined in the Red Seal National Occupational Analysis available here.

Appendix C

Previous Contributors

Previous Contributors

Subject Matter Experts retained to assist with the review and update of the Program Outline (2014):

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