

# Carpenter Level 2

## Carpenter

**Unit:** A5 Site Layout II

**Level:** Two

**Duration:** 14 hours

Theory: 7 hours

Practical: 7 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of site layout tools and equipment and their applications and procedures for use, as well as the procedures used to determine elevations using site layout equipment, to lay out building lines, and the associated calculations.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Define terminology associated with site layout and the layout of building lines.	5%
2. Identify hazards and describe safe work practices pertaining to site layout and the layout of building lines.	2%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to site layout and the layout of building lines.	20%
4. Identify tools and equipment used to perform site layout and the layout of building lines and describe their applications and procedures for use. a. Total stations b. Theodolites c. Transits	20%
5. Explain surveying theory as it pertains to site layout.	2%
6. Describe the procedures used to perform site layout. a. Establish offsets b. Determine locations of building and other structures c. Lay out building lines	5%
7. Perform calculations pertaining to site layout and layout of building lines.	6%
8. Use site layout equipment to determine elevations and lay out building lines.	40%

## Carpenter

**Unit:** A8 Building Envelope

**Level:** Two

**Duration:** 7 hours

Theory: 7 hours

Practical: 0 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of the building envelope and its components, and of the procedures used to install building envelope components.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Define terminology associated with the building envelope.	20%
2. Identify hazards and describe safe work practices pertaining to the building envelope.	1%
3. Interpret codes, regulations, manufacturers' specifications and information found on drawings and specifications pertaining to the building envelope.	5%
4. Identify types of membranes and describe their purpose and applications. a. Vapour barriers b. Waterproofing/damp-proofing barriers c. Air barriers d. Weather/moisture barriers	15%
5. Identify types of tapes, sealants and insulating materials and describe their characteristics and applications.	20%
6. Identify the factors to consider when selecting and installing membranes, sealants and insulating materials.	20%
7. Describe the procedures used to install membranes and sealants. a. Foundation b. Floors c. Walls d. Ceilings e. Penetrations f. Roof	5%
8. Describe the procedures used to install insulating materials.	5%

9. Calculate materials needed to create a building envelope. 5%
10. Demonstrate the procedures to select and install membranes, sealants and insulating materials. 4%

## Carpenter

**Unit: A9 Building Science Principles and Practices**

**Level:** Two

**Duration:** 28 hours

Theory: 14 hours

Practical: 14 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of building science principles and practices, and their impact on buildings and their surroundings.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Define terminology associated with building science principles and practices.</b>	<b>7%</b>
<b>2. Interpret codes, regulations and specifications pertaining to building science practices.</b>	<b>1%</b>
<b>3. Identify building science principles affecting the surrounding environment.</b>	<b>10%</b>
a. Wind effects/air flow patterns	
b. Drainage patterns	
c. Solar gain	
d. Shading	
e. Sound transmission	
<b>4. Explain heat transfer principles and their impact on buildings.</b>	<b>10%</b>
a. Conduction	
b. Convection	
c. Radiation	
<b>5. Identify energy efficient construction techniques and considerations, and describe their impact on the building as a system.</b>	<b>15%</b>
a. Thermal mass	
b. Building orientation	
c. Active/passive solar	
d. Framing/insulating	
e. Shading	
f. Reclamation/management of water	
<b>6. Identify methods and products that help contribute to an environmentally responsible and sustainable building.</b>	<b>8%</b>
a. Using recycled/recyclable materials	
b. Reducing carbon footprint	

- c. Conserving water
  - d. Using renewable resources
  - e. Employing adaptable building principles
  - f. Maintaining indoor air quality
- 7. Describe the potential impacts of and procedures used to control air leakage, inadequate insulation and heat transfer in buildings. 10%**
- a. Ice dams
  - b. Energy inefficiency
  - c. Inclement environment
  - d. Condensation, ice and frost build-up
  - e. Structural and cosmetic damage
- 8. Describe the principles of airflow and its impact on buildings and procedures used to control airflow in buildings. 5%**
- a. Natural
  - b. Mechanical
- 9. Describe the principles of moisture flow and its impact on buildings and procedures used to control moisture flow in buildings. 20%**
- a. Moisture movement
    - Gravity
    - Capillary action
    - Airflow
    - Diffusion
    - Pressure differences
    - Hydrostatic pressure
  - b. Sources of moisture
    - Dew points and relative humidity
    - Leaks
    - Occupations (people, plants, pets)
    - Building use
    - Environmental
  - c. Effects of moisture
    - Deterioration (rot, rust)
    - Mold/mildew
    - Air quality
- 10. Describe the principles of sound transmission and its impact on buildings and procedures used to control sound transmission in buildings. 6%**
- a. Sound management mechanisms
  - b. Potential sources of noise
- 11. Describe the concept of off-gassing and procedures used to control or eliminate off-gassing. 5%**
- 12. Describe types of drainage systems and describe their characteristics and applications, and the procedures used to control surface and ground water. 3%**

## **Carpenter**

**Unit:** B4 Computer Applications and Carpentry

**Level:** Two

**Duration:** 14 hours

Theory: 14 hours

Practical: 0 hours

### **Overview:**

Upon completion of this unit the apprentice will demonstrate knowledge of computer technology as it applies to the trade of Carpenter.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Describe basic computer components and their functions.	5%
2. Perform basic word-processing operations.	10%
3. Describe internet system components.	10%
4. Perform web searches using search engines.	10%
5. Send/receive email messages.	10%
6. Identify trade-related areas where computer use is important.	50%
7. Identify resources for ongoing self-directed learning regarding computers.	5%

## Carpenter

**Unit:** D1 Beams, Floor and Deck Framing

**Level:** Two

**Duration:** 24 hours

Theory: 14 hours

Practical: 10 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of beams, supports, floor and deck systems, their characteristics, components, accessories, materials and their applications, and of the procedures used to construct and install beams, supports and decks, and to layout and frame floor systems.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Define terminology associated with beams, supports, decks and floor systems.	5%
2. Identify hazards and describe safe work practices pertaining to beams, supports, decks and floor systems.	3%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to the construction and installation of beams, supports, decks and floor systems.	7%
4. Identify tools and equipment used to construct and install beams, supports, decks and floor systems, and describe their applications and procedures for use.	5%
5. Identify types of beams, supports, decks and floor systems, and describe their characteristics and applications. a. Built-up b. Engineered c. Steel d. Dimensional lumber e. Site-built f. Prefabricated	10%
6. Identify deck and floor system components, accessories and materials, and describe their characteristics, purpose and applications.	5%
7. Identify fastening methods used to install beams and supports, and to connect, anchor and fasten floor and deck systems and describe their associated procedures.	5%
8. Describe the forces acting on beams.	5%



- 9. Identify factors to consider when determining and selecting beam, support, deck and floor systems. 5%**
- a. Barrier free/accessible decks
- Ramps
  - Guards/rails
  - Landings
  - Mechanical
  - Electrical
  - HVAC
- 10. Calculate dimensions and materials needed to construct a deck or floor system. 10%**
- a. Ramps
- b. Landings
- 11. Describe the procedures used to construct and install beams, supports, decks and floor systems, and to attach decks to existing structures. 10%**
- 12. Demonstrate the procedures to construct and install beams, supports, decks and floor systems. 30%**

## Carpenter

**Unit: D2 Wall and Partition Framing**

**Level:** Two

**Duration:** 28 hours

Theory: 14 hours

Practical: 14 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of walls, partitions and preserved wood foundations, their applications, components, accessories and materials, and of the procedures used to lay out and frame walls and partitions, and to construct preserved wood foundations.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. <b>Define terminology associated with wall and partition layout and framing and preserved wood foundations.</b>	2%
2. <b>Identify hazards and describe safe work practices pertaining to wall and partition layout and framing and preserved wood foundations.</b>	5%
3. <b>Interpret codes, regulations and information found on drawings and specifications pertaining to wall and partition layout and framing and preserved wood foundations.</b>	5%
4. <b>Identify tools and equipment used with wall and partition layout and framing and preserved wood foundations and describe their applications and procedures for use.</b>	3%
5. <b>Identify types of walls and partitions and describe their characteristics and applications.</b> a. Load bearing b. Non-load bearing	5%
6. <b>Identify types of preserved wood foundations.</b> a. With concrete floor slab and wood footings b. With wood sleeper floors c. With framed wood floors d. On concrete strip footings	5%
7. <b>Identify materials used to construct preserved wood foundations, and describe their characteristics and applications.</b> a. Bracing, fasteners, adhesives b. Pressure-treated lumber and plywood c. Water-/damp-proofing	5%

- d. Backfill
8. **Identify wall and partition framing components, accessories and materials, and describe their purpose and applications.** **5%**
  9. **Identify factors to consider when selecting wall and partition systems.** **5%**
  10. **Identify factors to consider when constructing preserved wood foundations.** **5%**
    - a. Vertical loads
    - b. Lateral loads
    - c. Size and contact grade of preserved wood material
    - d. Thickness and grade of treated plywood
    - e. Stud spacing
    - f. Blocking
    - g. Soil conditions
    - h. Finished grade
    - i. Granular drainage layer
    - j. Special drainage requirements
  11. **Identify construction techniques pertaining to walls, partitions and preserved wood foundations.** **10%**
  12. **Describe the procedures used to lay out, frame and erect walls and partitions.** **15%**
  13. **Calculate materials needed to construct walls, partitions and preserved wood foundations.** **10%**
  14. **Demonstrate the procedures to lay out and frame walls and partitions and to construct preserved wood foundations.** **20%**

## Carpenter

**Unit:** D3 Roof Framing I

**Level:** Two

**Duration:** 72 hours

Theory: 30 hours

Practical: 42 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of components, accessories and materials used to lay out and frame hip and gable roofs, and of the procedures used to lay out and frame hip and gable roofs.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Define terminology associated with hip and gable roofs.	5%
2. Identify hazards and describe safe work practices pertaining to hip and gable roofs.	5%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to hip and gable roofs.	10%
4. Identify tools and equipment, framing components, members, accessories and materials used in the construction of hip and gable roofs and describe their purpose, applications and procedures for use.	5%
5. Describe the procedures used to lay out and frame hip and gable roofs and install engineered hip and gable roof trusses.	20%
6. Calculate dimensions associated with hip and gable roof layout.	20%
7. Calculate materials needed to frame hip and gable roofs.	10%
a. Framing components	
b. Sheathing	
8. Demonstrate the procedures to lay out and frame a hip and a gable roof.	25%

## Carpenter

**Unit:** E1 Roof Coverings

**Level:** Two

**Duration:** 14 hours

Theory: 7 hours

Practical: 7 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of roof coverings, their characteristics and applications, of roofing accessories, their characteristics and applications, and of the procedures used to remove and install roof coverings and accessories.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Define terminology associated with roof coverings and accessories.	3%
2. Identify hazards and describe safe work practices pertaining to roof coverings and accessories.	5%
3. Interpret codes, regulations, manufacturers' specifications and information found on drawings and specifications pertaining to roof coverings and accessories.	5%
4. Identify tools and equipment used with roof coverings and accessories, and describe their applications and procedures for use.	5%
5. Identify types of residential and commercial roof coverings and describe their characteristics and applications. a. Sloped b. Flat	5%
6. Identify roofing accessories, fasteners and sealants and describe their characteristics and applications.	7%
7. Explain the importance of sloped roof eave and valley protection.	5%
8. Identify potential roof covering problems and describe the procedures used to prevent them.	5%
9. Describe the procedures used to remove and install roof coverings and accessories.	10%
10. Calculate materials needed to install roof coverings and roofing accessories.	10%
11. Demonstrate the procedures to remove and install roof coverings and accessories.	40%

## Carpenter

**Unit:** E2 Exterior Doors, Windows and Hardware

**Level:** Two

**Duration:** 31 hours

Theory: 17 hours

Practical: 14 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of exterior door and window assemblies, hardware and accessories, and of the procedures used to lay out and install exterior door and window assemblies, hardware and accessories and to alter and repair exterior door and window assemblies, hardware and accessories.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Define terminology associated with exterior doors, windows, hardware and accessories.	5%
2. Identify hazards and describe safe work practices pertaining to exterior doors, windows, hardware and accessories.	2%
3. Interpret codes, regulations, manufacturers' specifications and information found on drawings and specifications pertaining to exterior doors, windows, hardware and accessories.	13%
4. Identify tools and equipment used with exterior doors, windows, hardware and accessories and describe their applications and procedures for use.	3%
5. Identify types of exterior door and window frames, hardware, components and accessories and describe their characteristics and applications. <ul style="list-style-type: none"> <li>a. Barrier-free accessibility</li> <li>b. Blocking and framing</li> <li>c. Residential</li> <li>d. Industrial, commercial, institutional (ICI)</li> </ul>	20%
6. Identify factors to consider when selecting and installing exterior door and window frames, hardware and accessories. <ul style="list-style-type: none"> <li>a. Barrier-free accessibility</li> <li>b. Energy efficiency</li> <li>c. Sound transmission/reduction</li> <li>d. Fire rating</li> <li>e. Egress</li> <li>f. Security/safety</li> </ul>	10%

g. Moisture control

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|---|------------|
| <b>7. Describe the procedures used to lay out, install, alter and repair exterior door and window assemblies, hardware and accessories.</b> | <b>15%</b> |
| <b>8. Calculate materials needed to install an exterior door assembly.</b>  | <b>2%</b>  |
| <b>9. Demonstrate the procedures to lay out, install, alter and repair door and window assemblies, hardware and accessories.</b>            | <b>30%</b> |

## Carpenter

**Unit: E3 Exterior Wall Coverings and Trim**

**Level:** Two

**Duration:** 24 hours

Theory: 10 hours

Practical: 14 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of exterior wall coverings, cladding and trim, their characteristics and applications, and of the procedures used to remove and install exterior wall coverings and to remove and install cladding and trim.

<b>Objectives and Content:</b>	<b>Percent of Unit Mark %</b>
1. Define terminology associated with exterior wall coverings, cladding and trim.	5%
2. Identify hazards and describe safe work practices pertaining to exterior wall coverings, cladding and trim.	2%
3. Interpret codes, regulations, manufacturers' specifications and information found on drawings and specifications pertaining to exterior wall coverings, cladding and trim.	8%
4. Identify tools and equipment used with exterior wall coverings, cladding and trim, and describe their applications and procedures for use.	5%
5. Explain the effect of weather, wind load and pressure changes on exterior wall coverings, cladding and trim.	2%
6. Identify types of exterior wall coverings, cladding, trim and accessories, and describe their characteristics and applications.	5%
7. Identify the factors to consider when selecting and installing exterior wall coverings, cladding and trim. <ul style="list-style-type: none"> <li>a. Energy efficiency</li> <li>b. Sound reduction</li> <li>c. Fire rating</li> <li>d. Safety/security</li> </ul>	3%
8. Identify methods used to protect against water penetration, and describe their associated procedures.	5%



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| <b>9.</b>  | <b>Describe the procedures used to remove and install exterior wall coverings, cladding and trim.</b>        | <b>10%</b> |
| <b>10.</b> | <b>Calculate materials needed to install exterior wall coverings, cladding and trim.</b>                     | <b>20%</b> |
| <b>11.</b> | <b>Demonstrate the procedures to layout, install, and remove exterior wall coverings, cladding and trim.</b> | <b>35%</b> |

## Carpenter

**Unit:** F1 Stairs I

**Level:** Two

**Duration:** 24 hours

Theory: 10 hours

Practical: 14 hours

### Overview:

Upon completion of this unit the apprentice will demonstrate knowledge of exterior wood straight stairs, their characteristics and applications and of the procedure used to lay out, construct and install exterior straight stairs.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
1. Define terminology associated with exterior wood straight stairs.	5%
2. Identify hazards and describe safe work practices pertaining to exterior wood straight stairs.	2%
3. Interpret codes, regulations and information found on drawings and specifications pertaining to exterior wood straight stairs.	10%
4. Identify tools and equipment used with exterior wood straight stairs and describe their applications and procedures for use.	3%
5. Identify and describe exterior straight stairs and their components and describe their characteristics, purpose and applications.	15%
a. Balustrades	
b. Hand rails	
c. Treads and risers	
d. Stringers	
e. Landings	
f. Concrete stairs	
6. Describe the procedures used to lay out, construct and install exterior wood straight stairs and their components.	15%
7. Calculate exterior wood straight stair dimensions and landings.	15%
8. Demonstrate the procedures to lay out and construct exterior wood straight stairs.	35%