Apprenticeship Manitoba

Manitoba

Plumber
Level 3

04-2025

Apprenticeship Manitoba

Plumber

Unit: **C1 Mentoring Techniques**

Level: Three

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

The journeyperson's obligation to assist entry-level apprentices to develop skills and knowledge is complex and challenging. It involves safety considerations, employer expectations, provincial regulations, as well as the tradition of skills stewardship that links modern practice with the long history of workplace teaching and learning that defines the apprenticeable trades. The ability to offer timely and appropriate support to apprentices is itself an important area of trade learning. This unit presents material intended to help refine this ability through reflection and discussion by senior apprentices, and discussion with their in-school instructor and journeyperson trainer.

This content reflects Manitoba and Canadian standards prescribed for journeyperson-level supervisory capabilities, as well as key topics in current research on the importance of workplace training in apprenticeship systems. These detailed descriptors represent suggested focal points or guidelines for potentially worthwhile exploration and are neither mandatory nor exhaustive.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Describe strategies for learning skills in the workplace.	**50%**
a. Shared responsibilities for workplace learning.	
b. One's own learning experience, preferences and how these relate to learning new skills.	
c. Importance of skills for success (e.g., essential skills) in workplace.	
d. Different learning styles and needs.	
e. Other strategies to assist in learning a skill.	
2. Describe strategies for teaching workplace skills.	**50%**
a. Importance of determining the context and purpose of the lesson.	
b. Different roles and styles assumed by a workplace mentor.	
c. Importance of good timing to present the lesson.	
d. Importance of linking lessons and providing feedback.	
e. Context for setting up opportunities for learning skills and skill practice.	
f. How to assess one's skills, progress and adjustment to different situations.	

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Unit: **C2 Sewers**

Level: Three
Duration: 21 hours
Theory: 21 hours
Practical: 0 hours

Overview:

This unit of instruction is designed to provide the apprentice with knowledge and skills about storm and combinations drainage systems.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with sewers. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2. Identify hazards and describe safe work practices pertaining to storm and combination drainage systems.	**5%**
3. Interpret information pertaining to storm and combination drainage systems. a. Codes b. Regulations c. Other	**10%**
4. Identify tools and equipment relating to storm and combination drainage systems and describe their applications and procedures for use.	**10%**
5. Identify types of storm and combination drainage systems, their components and describe their characteristics, applications and purpose. a. Piping b. Roof drains c. Area drains d. Fire stopping e. Expansion joints f. Sizing storm g. Grading and elevation	**10%**
6. Describe the procedures used to determine hydraulic load on storm and combination drainage systems. a. Conversion Factors b. Code requirements	**20%**

7. Describe the procedures for storm and combination drainage systems. **20%**

a. Grade piping
b. Install
c. Maintenance
d. Repair
e. Test
f. Troubleshoot

8. Describe the procedures used to protect storm and combination drainage systems. **20%**

a. Insulating
b. Supporting
c. Identification
d. Per mechanical specifications

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Unit: **C3 Interior Drainage, Waste and Vent Systems III**

Level: Three
Duration: 56 hours
Theory: 42 hours
Practical: 14 hours

Overview:

This unit of instruction is designed to provide the apprentice with knowledge and skills about commercial waste systems and sanitary drainage systems.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with commercial waste systems and sanitary drainage and venting systems. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2. Identify hazards and describe safe work practices pertaining to commercial waste systems and sanitary drainage, and venting systems.	**5%**
3. Interpret codes and regulations pertaining to commercial waste systems and sanitary drainage, and venting systems.	**5%**
4. Interpret information found on drawings and specifications. a. Commercial waste systems b. Sanitary drainage systems c. Venting systems	**5%**
5. Identify tools and equipment relating to commercial waste systems and drainage, waste and venting drainage, waste and venting (DWV) systems, and describe their applications and use.	**5%**
6. Identify types of commercial waste systems and sanitary DWV systems and describe their characteristics and applications. a. Systems • Municipal sewage • Waste water treatment plants • Corrosive waste • Indirect waste b. Vents • Stack vent • Vent stack • Individual vent • Branch vent	**5%**

- Dual vent
- Vent header
- Continuous vent
- Wet vent
- Relief vent
- Circuit vent
- Yoke vent
- Offset relief vent
- Additional circuit vent

7. Identify commercial waste systems and sanitary DWV system components and describe their purpose and applications. **5%**

a. Interceptors
b. Traps
c. Drains
d. Cleanouts/maintenance holes
e. Primers
f. Fire stopping
g. Piping
h. Fixtures
i. Traps
j. Cleanouts
k. Joints and connections
l. Air admittance valve
m. Receiving tanks
n. Sewage sump and related pumps
o. Piping connections
p Vents
q. Piping

8. Identify the factors to consider when sizing commercial waste systems and sanitary drainage system components. **10%**

9. Describe the procedures used to size commercial waste systems and sanitary DWV system components. **10%**

10. Determine and transfer grade, percent of grade and elevation for piping in commercial waste systems and sanitary DWV systems. **5%**

11. Describe the procedures used to protect commercial waste systems and waste systems from extreme conditions. **5%**

a. High temperature
b. Corrosive waste
c. Bio-waste

12. Describe and demonstrate the procedures used in commercial waste systems and sanitary DWV systems. **35%**

a. Layout and rough-in/install
b. Grade piping
c. Protect
d. Maintenance
e. Troubleshoot
f. Repair
g. Test

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Unit: **C4 Municipal Water Service Systems**

Level: Three
Duration: 14 hours
Theory: 10 hours
Practical: 4 hours

Overview:

This unit of instruction is designed to provide the apprentice with knowledge and skills about municipal water service.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with municipal water service systems. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2. Identify hazards and describe safe work practices pertaining to municipal water service systems	**5%**
3. Interpret information, codes and regulations pertaining to municipal water service. a. Residential • Single family dwelling homes • Mobile homes b. Commercial/institutional	**5%**
4. Identify types of municipal water service systems, equipment and components and describe their purpose, operation, characteristics and applications. a. Corporation main stop b. Expansion loop c. Curb stop d. Meters e. Bypass f. Strainers g. Check valves h. Backflow preventers i. Piping and fittings j. Main shut-off k. Pressure reducing valve l. Hot tapping	**10%**

5. Identify municipal water service supply piping supports and restraints and describe their purpose and applications. **10%**

a. Anchors
b. Rods
c. Tie rods
d. Thrust blocks
e. Mega lugs

6. Identify the factors to consider in determining elevations and grades for water service supply piping. **5%**

7. Determine and transfer grade, percent of grade and elevation for piping in municipal water service systems. **15%**

8. Describe the procedures used to rough-in and install, protect, maintain and repair, test and troubleshoot, layout and install municipal water service supply piping in trenches and municipal water service components. **15%**

a. Recirculation pump
b. Frost box
c. Heat tracing
d. Insulation

9. Demonstrate the procedures in municipal water service to determine and transfer grade and elevation measurements for municipal water service equipment, and components. **30%**

a. Install
b. Maintenance
c. Troubleshoot
d. Repair
e. Test

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Unit: **C5 Rural Water Service Systems**

Level: Three
Duration: 35 hours
Theory: 28 hours
Practical: 7 hours

Overview:

This unit of instruction is designed to provide the apprentice with knowledge and skills about rural water service systems.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with rural water service systems. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2. Identify hazards and describe safe work practices pertaining to rural water supply.	**5%**
3. Interpret information pertaining to rural water supply found on drawings and specifications, well drillers information reports and pump charts. a. Codes b. Regulations	**10%**
4. Identify tools and equipment relating to rural water supply systems and describe their applications and procedures for use.	**5%**
5. Identify surface sources, types of wells, common contamination sources of rural water supply and describe their characteristics. a. Rivers b. Lakes c. Ponds d. Streams e. Cisterns f. Springs g. Shallow well h. Deep well i. Dug well j. Bored well k. Driven well l. Drilled well m. Washed sand point	**5%**
6. Identify considerations for determining location of wells.	**5%**

7. Explain forces that impact on pipe and tubing in rural water supply systems. 10%

a. Weight
b. Friction loss
c. Turbulence
d. Galvanic action

8. Identify rural water supply system components and describe their characteristics and applications. 10%

a. Foot valves
b. Piping
c. Clamps
d. Pumps and variable speed pumps
e. Pressure tanks
f. Controls
g. Shut-off valves
h. Relief valves
i. Air volume controls
j. Drain valves
k. Pitless adapter
l. Torque arrestors
m. Sand points

9. Identify types of pumps and describe their components, applications and operation. 10%

a. Positive displacement pumps
b. Variable displacement pumps

10. Identify types of pressure tanks and associated controls, and describe their components, applications and operation. 10%

a. Galvanized
b. Diaphragm
c. Bladder
d. Floated
e. In-line

11. Describe and demonstrate the procedures used for rural water supply system components and equipment. 25%

a. Layout
b. Install
c. Protect
d. Maintenance
e. Troubleshoot
f. Repair
g. Test

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Unit: **C6 Potable Water Distribution I**

Level: Three
Duration: 21 hours
Theory: 21 hours
Practical: 0 hours

Overview:

This unit of instruction is designed to provide the apprentice with knowledge and skills about potable water distribution.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with potable water distribution. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2. Identify hazards and describe safe work practices pertaining to potable water distribution.	**5%**
3. Interpret codes and regulations pertaining to potable water distribution.	**5%**
4. Interpret information pertaining to potable water distribution found on drawings and specifications.	**5%**
5. Identify tools and equipment relating to potable water distribution and describe their applications and procedures for use.	**5%**
6. Explain water hammer, its causes and methods of prevention or control.	**5%**
7. Explain water flow characteristics and excess flow cavitation.	**5%**
8. Identify potable water distribution components and describe their characteristics and applications. a. Piping b. Fittings c. Valves d. Shock arrestors e. Recirculation lines and pumps f. Hose bibs g. Fire stopping h. Cross connection control i. Expansion tanks j. Pressure reducing valves	**5%**

9. Identify the factors to consider in sizing piping for water service and distribution. 10%

a. Number of fixture units
b. Developed length of pipe
c. Elevation
d. Available pressure

10. Calculate piping size requirements for water service and distribution. 40%

11. Describe the procedures used for potable water distribution system components and equipment. 10%

a. Layout (size) and rough-in/install
b. Test
c. Protect
d. Maintenance
e. Troubleshoot
f. Repair

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Unit: **C7 Potable Water Distribution II**

Level: Three

Duration: 21 hours

Theory: 16 hours

Practical: 5 hours

Overview:

This unit is designed to provide the apprentice with knowledge and skills about cross-connection control.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with cross-connection control. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2. Identify hazards and describe safe work practices pertaining to cross-connection control.	**5%**
3. Interpret codes and regulations pertaining to cross connection-control: training and certification requirements.	**5%**
4. Interpret information pertaining to cross connection-control found on drawings and specifications.	**5%**
5. Identify tools and equipment relating to cross-connection control and describe their applications and procedures for use.	**5%**
6. Explain backflow and its causes.	**5%**
7. Identify the procedures used for cross-connection control assemblies, and describe their types, characteristics, operation and applications. a. Install b. Test c. Protect d. Maintenance e. Troubleshoot f. Repair and Re-test	**25%**
8. Demonstrate the procedures used for cross-connection control devices. a. Install b. Maintenance c. Troubleshoot d. Repair	**45%**

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Unit: **C8 Piping and Components for Hydronic Systems**

Level: Three
Duration: 14 hours
Theory: 2 hours
Practical: 12 hours

Overview:

This unit of instruction is designed to provide knowledge and skills for piping and components for hydronic systems.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with piping and components for hydronic systems. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2. Identify hazards and describe safe work practices pertaining to piping and components for hydronic systems.	**5%**
3. Demonstrate the procedures used for heat transfer equipment. a. Install b Protect c. Maintenance d. Troubleshoot e. Repair f. Test	**45%**
4. Demonstrate the procedures used for hydronic system components. a. Install b Protect c. Maintenance d. Troubleshoot e. Repair f. Test	**45%**

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Unit: **C9 Control Systems for Hydronic Heating and Cooling Equipment**

Level: Three

Duration: 42 hours

Theory: 31 hours

Practical: 11 hours

Overview:

This unit of instruction is designed to provide the apprentice with knowledge and skills about control systems used in hydronic and pump systems.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with controls used in hydronic and pump systems. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2 Identify hazards and describe safe work practices pertaining to controls used in hydronic and pump systems.	**5%**
3. Identify and describe electrical controls.	**5%**
4. Identify and describe diagrams for hydronic and pump control systems.	**5%**
5. Identify types of electrical circuits used in hydronic and pump systems.	**10%**
6. Identify electrical controls used in hydronic and pump systems.	**15%**
7. Explain the operation of electrical controls in hydronic and pump systems.	**15%**
8. Read and interpret electrical related information on hydronic and pump control schematics.	**10%**
9. Demonstrate the use of proper electrical tools and testing equipment on hydronic and pump control systems.	**10%**
10. Troubleshoot controls in hydronic and pump systems.	**20%**

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Unit: **C10 Specialized Systems I**

Level: Three
Duration: 21 hours
Theory: 15 hours
Practical: 6 hours

Overview:

This unit will focus on specialized systems for residential irrigation, compressed air, and green systems.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with specialty piping systems. a. Refer to Plumber Red Seal Occupational Standard (RSOS).	**5%**
2. Identify hazards and describe safe work practices pertaining to specialty piping systems.	**5%**
3. Interpret information pertaining to specialty piping systems drawings and specifications. a. Codes b. Regulations	**10%**
4. Identify types of specialty piping systems, components, and describe their purpose, characteristics and applications.	**15%**
5 Identify the factors to consider when sizing specialty piping system components.	**10%**
6. Describe the procedures used to size specialty piping system components.	**10%**
7. Determine and transfer grade, percent of grade and elevation for piping in specialty piping systems.	**10%**
8. Describe the procedures used to grade piping in specialty piping systems.	**10%**
9. Describe and demonstrate the procedures used for specialty piping systems. a. Layout and rough-in/install b. Protect c. Maintain d. Troubleshoot e. Repair f. Test	**25%**

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Unit: **C11 Routine Trade Activities III: Drawings**

Level: Three

Duration: 28 hours

Theory: 13 hours

Practical: 15 hours

Overview:

This unit of instruction is designed to provide the apprentice with knowledge and skills that reinforce and further enhance the techniques of sketching and drawing, and other drawing practices.

Objectives and Content:	**Percent of Unit Mark (%)**
1. Define terminology associated with trade related sketches and drawings. a. Isometric b. Orthographic	**5%**
2. Describe and demonstrate techniques to construct isometric or orthographic sketches of piping systems using relevant line and piping symbols, and correct shapes and proportions. a. Isometric sketching and drawing b. Orthographic sketching and drawing c. Line symbols d. Piping symbols	**15%**
3. Describe techniques to interpret plan elevations, sections and details from building trade drawings to the orthographic drawing system. a. Architectural b. Structural c. Mechanical d. Electrical	**20%**
4. Describe how to extract the basic information from a typical set of specifications. a. Fixture types b. Hangers and supports c. Types of pipe and fittings for various services d. Other	**10%**
5. Describe the development of a set of trade drawings and specifications, and their relationship to the engineering professionals involved in the project. a. Architect (prime consultant) b. Structural engineer c. Mechanical engineer	**5%**

d. Electrical engineer

6. Describe the theory of sections used in industry to develop project specifications. 5%

a. CSI standards

7. Given a set of architectural drawings, produce a working set of plumbing drawings as related to the mechanical section of building trade drawings: 40%

a. Interpret and extract architectural and structural information from drawings by having the plumbing systems conform to the conditions of the building (beams, ceiling spaces, etc.) (T),
b. Use the correct line and piping symbols for showing rainwater leaders, storm sewer, sanitary sewer, vents, acid waste, cold water, hot water and recirculated hot water lines (P),
c. Interpret site plan information by connecting building services to street mains, including the calculation of satisfactory invert elevations of storm and sanitary drains at the building line (T),
d. Indicate specification references by identifying each different plumbing fixture by a "P-number" system. (T),
e. Use her/his code tables with reference to an actual building condition in calculating storm sewer (roof area) sizes and sanitary sewer and vent (fixture unit count) sizes. (T),
f. Construct accurate isometric drawings of washroom groups from orthographic piping layouts (floor plans). (P)
g. Production of a working set of building drawings in the students' trade area. (P)

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