Apprenticeship Manitoba

Manitoba

# Welder
# Level 3

Rev. March 2014

Apprenticeship Manitoba

# Welder

## Unit: B2 Layout, Pattern Development, Jigs and Fixtures

**Level:** Three

**Duration:** 18 hours

Theory: 11 hours

Practical: 7 hours

**Overview:**

This unit is designed to introduce knowledge of pattern and template development and its purpose. It is also designed to introduce knowledge of the procedures used to develop simple templates.

| **Objectives and Content:** | | **Percent of Unit Mark (%)** |
|---|---|---|
| **1.** | **Define terminology associated with layout and pattern development.** | **5%** |
| **2.** | **Identify tools and equipment relating to layout and pattern development and describe their applications and procedures for use.** | **10%** |
| **3.** | **Explain the purpose of pattern and template development.** | **10%** |
| **4.** | **Identify materials used in pattern and template development and describe their characteristics and applications.** | **10%** |
| **5.** | **Identify geometric operations used in performing layout and describe their applications.** | **5%** |
| **6.** | **Develop simple templates.** | **10%** |

## B2.a Layout, Pattern Development, Jigs and Fixtures

| **Objectives and Content:** | | **Percent of Unit Mark (%)** |
|---|---|---|
| **1.** | **Define terminology associated with jigs and fixtures.** | **5%** |
| **2.** | **Identify hazards and describe safe work practices pertaining to jigs and fixtures.** | **5%** |
| **3.** | **Interpret information found on drawings to fabricate basic jigs and fixtures.** | **10%** |
| **4.** | **Explain the purpose, applications and limitations of basic jigs and fixtures.** | **10%** |
| **5.** | **Identify types of basic jigs and fixtures and describe their characteristics and applications.** | **10%** |

**6. Describe the procedures used to fabricate jigs and fixtures. 10%**

***

Apprenticeship Manitoba

# Welder

## Unit: C2 Metallurgy

**Level:** Three

**Duration:** 21 hours

Theory: 21 hours

Practical: 0 hours

**Overview:**

This unit of is designed to demonstrate knowledge of metals and their characteristics. It also introduces knowledge of metallurgical principles. In addition, it introduces knowledge of material testing procedures.

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Define terminology associated with metallurgy.** | **5%** |
| **2. Describe the properties of metals.**<br>a. Mechanical<br>b. Physical | **5%** |
| **3. Indentify types of metals and describe their characteristics and applications.**<br>a. Plain carbon steel<br>b. Low alloy steel<br>c. Heat treated steel<br>d. Stainless steel<br>e. Duplex stainless steel.<br>f. Non-ferrous | **20%** |
| **4. Describe classification numbering systems for metals.**<br>a. Society of Automotive Engineers (SAE)<br>b. American Iron and Steel Institute (ANSI)<br>c. American Society of Testing and Materials (ASTM)<br>d. Canadian Standards Association (CSA) | **5%** |
| **5. Describe the processes used in the heat treatment of metals.**<br>a. Stress relieving<br>b. Quenching<br>c. Hardening<br>d. Tempering<br>e. Annealing<br>f. Normalizing | **15%** |

**6. Identify the methods and processes used in the manufacture of steel and alloys. 5%**

**7. Describe forging and casting processes. 5%**

**8. Describe the effects of hot and cold working on metals. 10%**

a. Stress
b. Contraction
c. Expansion
d. Distortion
e. Work hardening

**9. Describe the procedures used to prevent or correct problems that occur when working with metals. 10%**

**10. Identify the causes of corrosion and describe the methods used to prevent or correct them. 10%**

a. Oxidation
b. Galvanic corrosion
c. Chemical corrosion

**11. Describe common metal testing techniques and describe their associated procedures. 10%**

a. Rockwell hardness
b. Brinell hardness
c. Tensile
d. Charpy impact
e. Izod impact

***

Apprenticeship Manitoba

# Welder

## Unit: D4 Shielded Metal Arc Welding (SMAW) III

**Level:** Three

**Duration:** 84 hours

Theory: 14 hours

Practical: 70 hours

**Overview:**

This unit is designed to introduce knowledge of the procedures used to prepare pipe and tubing for shielded metal arc welding (SMAW) welds. It also introduces knowledge of the procedures used to weld pipe and tubing in all positions using the SMAW process.

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Define terminology associated with SMAW welds on pipe and tubing.** | **2%** |
| **2. Interpret information pertaining to SMAW welds on pipe and tubing found on drawings and specifications.** | **2%** |
| **3. Identify the considerations when selecting consumables and determining equipment set-up for performing SMAW welds on pipe and tubing in all positions.**<br>a. Specifications requirements<br>b. Base metal<br>• Composition<br>• Thickness<br>c. Power source<br>d. Welding position<br>e. Joint type and design | **5%** |
| **4. Identify the requirements and describe the procedures to store consumables used for SMAW welds on pipe and tubing.** | **2%** |
| **5. Describe the procedures used to prepare on pipe and tubing base metals and joints for SMAW welds.** | **7%** |
| **6. Describe the procedures used to perform welds on pipe and tubing in all positions using SMAW process.** | **2%** |
| **7. Describe the procedures used to prevent and correct weld faults.** | **2%** |
| **8. Perform SMAW welds on pipe and tubing in all positions.** | **25%** |

## D4.a Shielded Metal Arc Welding (SMAW) III

**Objectives and Content:** **Percent of Unit Mark (%)**

1. **Define terminology associated with SMAW welds on allow steels.** **2%**

2. **Interpret information pertaining to SMAW welds on allow steels found on drawings and specifications.** **3%**

3. **Identify types of alloy steels and describe their characteristics and applications.** **5%**

4. **Identify the considerations when selecting consumables and determining equipment set-up for performing SMAW welds on alloy steels in all positions.** **5%**
   a. Specification requirements.
   b. Base metal.
      - Composition
        -Carbon equivalents
      - Thickness
   d. Power source
   e. Welding position
   f. Joint type and design

5. **Identify the requirements and describe the procedures to store consumables used for SMAW welds on alloy steels.** **2%**

6. **Describe the procedures used to prepare alloy steel base metals and joints for SMAW welds.** **3%**

7. **Perform the procedures used to perform welds on alloy steels in all positions using the SMAW process.** **25%**

8. **Describe the procedures used to prevent and correct weld faults.** **5%**

***

Apprenticeship Manitoba

# Welder

## Unit: D8 Gas Metal Arc Welding (GMAW) III

**Level:** Three

**Duration:** 31 hours

Theory: 11 hours

Practical: 20 hours

**Overview:**

This unit is designed to introduce knowledge of the procedures used to prepare pipe and tubing for gas metal arc welding (GMAW) groove welds. It also introduces knowledge of the procedures used to weld pipe and tubing in all positions using the GMAW process.

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Define terminology associated with GMAW welds on pipe and tubing.** | **2%** |
| **2. Interpret information pertaining to GMAW welds on pipe and tubing found on drawings and specifications.** | **3%** |
| **3. Identify the considerations when selecting consumables and determining equipment set-up for performing GMAW welds on pipe and tubing in all positions.**<br>a. Specification requirements<br>b. Base metals<br>• Composition<br>• Thickness<br>c. Shielding gas selection<br>d. Power source<br>e. Welding position<br>f. Joint type and design | **3%** |
| **4. Identify the requirements and describe the procedures to store consumables used for GMAW welds on pipe and tubing.** | **2%** |
| **5. Describe the procedures used to prepare pipe and tubing base metals and joints for GMAW welds.** | **3%** |
| **6. Perform the procedures used to perform welds on pipe and tubing in all positions using GMAW process.** | **16%** |
| **7. Perform the procedures used to prevent and correct weld faults.** | **3%** |

## D8.a Gas Metal Arc Welding (GMAW) III

**Objectives and Content:** **Percent of Unit Mark (%)**

1. **Define terminology associated with GMAW welds on aluminum alloys.** **2%**

2. **Interpret information pertaining to GMAW welds on aluminum alloys found on drawings and specifications.** **2%**

3. **Identify types of aluminum alloys and describe their characteristics and applications.** **3%**

4. **Identify the considerations when selecting consumables and determining equipment set-up for performing GMAW welds on aluminum alloys in all positions.** **3%**
   a. Specific requirements
   b. Base metal.
      - Composition
      - Thickness
   c. Shielding gas selection
   d. Power source
      - Push/pull
      - Spool gun
   e. Welding position
   f. Joint type and design

5. **Identify the requirements and describe the procedures to store consumables used for GMAW welds on aluminum alloys.** **2%**

6. **Describe the procedures used to prepare aluminum base metals and joints for GMAW welds.** **5%**

7. **Describe the procedures used to perform welds on aluminum alloys in all positions using the GMAW process.** **15%**

8. **Describe the procedures used to prevent and correct weld faults.** **3%**

## D8.b Gas Metal Arc Welding (GMAW) III

**Objectives and Content:** **Percent of Unit Mark (%)**

1. **Define terminology associated with GMAW welds on stainless steel alloys.** **2%**

2. **Interpret information pertaining to GMAW welds on stainless steel alloys found on drawings and specifications.** **2%**

3. **Identify types of stainless steel alloys and describe their characteristics and applications.** **3%**

4. **Identify the considerations when selecting consumables and determining equipment set-up for performing GMAW welds on stainless steel alloys in all positions.** **3%**
   a. Specification requirements
   b. Base metal
      - Composition.
      - Thickness

c. Shielding gas selection
d. Power source
e. Welding position
f. Joint type and design

**5. Identify the requirements and describe the procedures to store consumables used for GMAW welds on stainless steel alloys. 2%**

**6. Describe the procedures used to prepare stainless steel base metals and joints for GMAW welds. 3%**

**7. Describe the procedures used to perform welds on stainless steel alloys in all positions using the GMAW process. 15%**

**8. Describe the procedures used to prevent and correct weld faults. 3%**

*******

Apprenticeship Manitoba

# Welder

## Unit: D10 Gas Tungsten Arc Welding (GTAW) II

**Level:** Three

**Duration:** 36 hours

Theory: 11 hours

Practical: 25 hours

**Overview:**

This unit is designed to introduce knowledge of gas tungsten arc welding (GTAW) equipment, consumables and accessories. It also introduces knowledge of the procedures used to set up, adjust, operate, inspect and maintain GTAW welding equipment. In addition, it introduces knowledge of the procedures used to deposit a weld bead using GTAW equipment.

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Define terminology associated with GTAW welds on pipe and tubing.** | **2%** |
| **2. Interpret information pertaining to GTAW welds on pipe and tubing found on drawings and specifications.** | **2%** |
| **3. Identify the considerations when selecting consumables and determining equipment set-up for performing GTAW welds on pipe and tubing.**<br>a. Specifications requirements<br>b. Base metal<br>c. • Composition<br>• Thickness.<br>d. Shielding gas selection<br>e. Insert selection<br>f. Power source<br>g. Welding position<br>h. Joint type and design | **3%** |
| **4. Identify the requirements and describe the procedures to store consumables used for GTAW welds on pipe and tubing.** | **3%** |
| **5. Describe the procedures used to prepare pipe and tubing base metals and joints for GTAW welds.** | **3%** |
| **6. Perform the procedures used to perform welds on pipe and tubing in all positions using GTAW process.** | **17%** |
| **7. Describe the procedures used to prevent and correct weld faults.** | **3%** |

## D10.a Gas Tungsten Arc Welding (GTAW) II

| Objectives and Content: | Percent of Unit Mark (%) |
|---|---|
| **1. Define terminology associated with GTAW welds on medium carbon steel.** | **2%** |
| **2. Interpret information pertaining to GTAW welds on medium carbon steel found on drawings and specifications.** | **2%** |
| **3. Identify the considerations when selecting consumables and determining equipment set-up for performing GTAW welds on medium carbon steel in all positions.**<br>a. Specification requirements<br>b. Base metal.<br>• Composition<br>• Thickness.<br>c. Shielding gas selection<br>d. Power source<br>e. Welding position<br>f. Joint type and design | **3%** |
| **4. Identify the requirements and describe the procedures to store consumables used for GMAW welds on medium carbon steel.** | **3%** |
| **5. Describe the procedures used to prepare medium carbon steel base metals and joints for GMAW welds.** | **3%** |
| **6. Perform the procedures used to perform welds on medium carbon steel using GMAW process.**<br>a. Temperature measuring devices<br>b. Interpass temperature<br>c. Post-heating<br>d. Stress relieving | **17%** |
| **7. Describe the procedures used to prevent and correct weld faults.** | **3%** |

## D10.b Gas Tungsten Arc Welding (GTAW) II

| Objectives and Content: | Percent of Unit Mark (%) |
|---|---|
| **1. Define terminology associated with GTAW welds on ferrous and non-ferrous alloys.** | **2%** |
| **2. Interpret information pertaining to GTAW welds on ferrous and non-ferrous alloys found on drawings and specifications.** | **2%** |
| **3. Identify types of ferrous and non-ferrous alloys and describe their characteristics and applications.** | **3%** |
| **4. Identify the considerations when selecting consumables and determining equipment set-up for performing GTAW welds on ferrous and non-ferrous alloys in all positions.**<br>a. Specification requirements | **3%** |

b. Base metal.
   - Composition
   - Thickness

c. Shielding gas selection
   - Trailing gas

d. Back purging

e. Power source

f. Welding position

f. Joint type and design

**5. Identify the requirements and describe the procedures to store consumables used for GMAW welds on ferrous and non-ferrous alloys. 3%**

**6. Describe the procedures used to perform welds on ferrous and non-ferrous alloys and joints for GTAW welds. 3%**

**7. Perform the procedures used to perform welds on ferrous and non-ferrous alloys in all positions using the GTAW process. 15%**

**8. Describe the procedures used to prevent and correct weld faults. 3%**

*******

Apprenticeship Manitoba

# Welder

## Unit: D12 Flux Core Arc Welding II

**Level:** Three

**Duration:** 7 hours

Theory: 1 hours

Practical: 6 hours

**Overview:**

This unit is designed to introduce knowledge of the procedures used to prepare pipe and tubing for flux core arc welding (FCAW) welds. It also introduces knowledge of the procedures used to weld pipe and tubing in all positions using the FCAW process.

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Describe terminology associated with FCAW welds on pipe and tubing.** | **5%** |
| **2. Interpret information pertaining to FCAW welds on pipe and tubing found on drawings and specifications.** | **10%** |
| **3. Identify the considerations when selecting consumables and determining equipment set-up for performing FCAW welds on pipe and tubing in all positions.**<br>a. Specifications requirements<br>b. Base metals<br>• Composition<br>• Thickness<br>c. Shielding gas selection<br>d. Power source<br>e. Welding position.<br>f. Joint type and design | **10%** |
| **4. Identify the requirements and describe the procedures to store consumables used for FCAW welds on pipe and tubing.** | **5%** |
| **5. Describe the procedures used to prepare pipe and tubing base metals and joints for FCAW welds.** | **10%** |
| **6. Perform the procedures used to perform welds on pipe and tubing in all positions using the FCAW process.** | **50%** |
| **7. Describe the procedures used to prevent and correct weld faults.** | **10%** |

***

Apprenticeship Manitoba

# Welder

## Unit: D13 Special Processes

**Level:** Three

**Duration:** 7 hours

Theory: 7 hours

Practical: 0 hours

**Overview:**

This unit is designed to introduce knowledge of the procedures used to prepare base metals for submerged arc welding (SAW). It also introduces the procedures used to weld using the SAW process.

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Define terminology associated with SAW welding.** | **2%** |
| **2. Identify hazards and describe safe work practices pertaining to SAW welding.** | **2%** |
| **3. Identify codes and standards pertaining to SAW welding.**<br>a. Canadian Standards Association (CSA)<br>b. American Society of Mechanical Engineers (ASME)<br>c. American Welding Society (AWS) | **2%** |
| **4. Interpret information pertaining to SAW welding found on drawings and specifications.** | **2%** |
| **5. Identify SAW welding equipment, consumables and accessories and describe their applications.** | **2%** |
| **6. Identify the considerations and describe the procedures to store consumables used for SAW welding equipment.** | **2%** |
| **7. Describe the procedures used to set up and adjust SAW welding equipment.** | **2%** |
| **8. Describe the procedures used to inspect and maintain SAW welding equipment.** | **2%** |
| **9. Describe the procedures and techniques used to deposit a weld bead using SAW welding equipment.**<br>a. Arc starting methods<br>b. Electrode extension<br>c. Deposition rates<br>d. Travel speeds<br>e. Penetration | **2%** |

**10. Identify the considerations when selecting consumables and determining equipment set-up for SAW welding.** **2%**

a. Specification requirements
b. Base metal
   - Properties
   - Thickness
c. Flux types
d. Back purging
e. Filler metal types
f. Welding position
f. Joint type and design

**11. Describe the procedures used to prepare base metals and joints for SAW welding.** **2%**

**12. Describe the procedures used to weld using the SAW process.** **2%**

**13. Describe the procedures used to prevent and correct weld faults.** **2%**

## D13.a Special Processes

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|

**1. Identify terminology associated with Resistance welding (RW) welding.** **2%**

**2. Identify hazards and describe safe work practices pertaining to RW welding.** **2%**

**3. Identify codes and standards pertaining to RW welding.** **2%**

a. Canadian Standards Association (CSA)

**4. Interpret information pertaining to RW welding found on drawings and specifications.** **2%**

**5. Identify RW welding processes and describe their applications.** **2%**

a. Spot
b. Seam
c. Projection

**6. Identify RW welding equipment and accessories and describe their applications.** **2%**

**7. Identify the considerations when determining RW welding equipment set-up.** **2%**

a. Specification requirements
b. Base metal
   - Properties
   - Thickness
c. Electrode size

**8. Describe the procedures used to set up and adjust RW welding equipment.** **2%**

a. Time
b. Amperage.
c. Pressure

**9. Describe the procedures used to inspect and maintain RW welding equipment.** **2%**

| | | |
|---|---|---|
| **10.** | **Describe the procedures used to prepare base metals for RW welding.** | **2%** |
| **11.** | **Describe the procedures used to weld using the RW process.** | **2%** |

## D13.b Special Processes

| **Objectives and Content:** | | **Percent of Unit Mark (%)** |
|---|---|---|
| **1.** | **Define terminology associated with stud welding.** | **2%** |
| **2.** | **Identify hazards and describe safe work practices pertaining to stud welding.** | **2%** |
| **3.** | **Identify codes and standards pertaining to stud welding.**<br>a. Canadian Standards Association (CSA)<br>b. American Society of Mechanical Engineers (ASME)<br>c. American Welding Society (AWS) | **2%** |
| **4.** | **Interpret information pertaining to stud welding found on drawings and specifications.** | **2%** |
| **5.** | **Identify stud welding equipment, consumables and accessories and describe their applications.** | **2%** |
| **6.** | **Identify the requirements and describe the procedures to store consumables used for stud welding.** | **2%** |
| **7.** | **Describe the procedures used to set up and adjust stud welding equipment.**<br>a. Time<br>b. Amperage<br>c. Lift<br>c. Plunge | **2%** |
| **8.** | **Describe the procedures used to inspect and maintain stud welding equipment.** | **2%** |
| **9.** | **Identify the considerations when selecting stud welding consumables and determining equipment set-up.**<br>a. Specification requirements<br>b. Base metal<br>• Properties<br>• Thickness<br>c. Stud<br>• Type<br>• Size | **2%** |
| **10.** | **Describe the procedures used to prepare base metals for stud welding.** | **2%** |
| **11.** | **Describe the procedures used to perform stud welding.** | **2%** |
| **12.** | **Describe the procedures used to prevent and correct weld faults.** | **2%** |
| **13.** | **Describe the procedures used to test welded studs.** | **2%** |

## D13.c Special Processes

| Objectives and Content: | Percent of Unit Mark (%) |
|---|---|
| **1. Define terminology associated with build up and surfacing of metal parts.** | **2%** |
| **2. Identify hazards and describe safe work practices pertaining to build up and surfacing of metal parts.** | **5%** |
| **3. Identify codes and standards pertaining to build up and surfacing of metal parts.**<br>a. Canadian Standards Association (CSA)<br>b. American Society of Mechanical Engineers (ASME)<br>c. American Welding Society (AWS) | **5%** |
| **4. Interpret information pertaining to build up and surfacing of metal parts found on drawings and specifications.** | **5%** |
| **5. Identify tools and equipment relating to build up and surfacing of metal parts and describe their applications.** | **5%** |
| **6. Explain the purpose and applications building up and surfacing of metal parts.** | **2%** |
| **7. Identify the processes used to build up and surface metal parts and describe the considerations used to select them.**<br>a. Shielded metal arc welding (SMAW)<br>b. Gas metal arc welding (GMAW)<br>c. Flux core arc welding (FCAW)<br>d. Metal core arc welding (MCAW)<br>e. Gas tungsten arc welding (GTAW)<br>f. Submerged arc welding (SAW)<br>g. Oxyfuel gas welding (OFW) | **5%** |
| **8. Identify types of wear requiring hard surfacing.**<br>a. Abrasion<br>b. Impact<br>c. Corrosion<br>d. Erosion | **2%** |
| **9. Perform the procedures used to build up and surface metal parts using welding processes.**<br>a. Identify base metal<br>b. Identify effects of heating and cooling<br>c. Identify effects of dilution<br>d. Select process<br>e. Select filler material<br>f. Determine sequence | **7%** |

***

Apprenticeship Manitoba

# Industrial Welder

**Unit:** **B4 Estimating**

**Level:** Three

**Duration:** 14 hours

Theory: 14 hours

Practical: 0 hours

**Overview:**

This unit is designed to provide the Industrial Welder Apprentice with the knowledge and understanding of estimating.

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Convert angular (degree) measurements to linear dimensions.** | **15%** |
| a. Converting angular measurements to linear measurements.<br>b. Units of angular measurement<br>c. Arc length<br>d. The right triangle<br>• Pythagorean theorem<br>• Ratio<br>• Trigonometry<br>e. Trigonometry tables | |
| **2. Calculate the cost of steel sections given the price per unit weight.** | **15%** |
| a. Calculating the cost of steel<br>b. Designations of various structural shapes<br>• Angle<br>• Tee<br>• Channel<br>• Zee<br>• Standard S-Beam (I-Beam)<br>• Wide-Flange Beam<br>• Rectangular and square bar<br>• Round bar and half round bar<br>• Hexagon bar<br>• Hollow structural steel (HSS) | |
| **3. Estimate the total costs for a given project.** | **70%** |
| a. Estimating<br>b. Generating the estimate and quote<br>• Generate an estimate sheet<br>• Develop your quote on a recapitulation sheet | |

***

Apprenticeship Manitoba

# Welder

**Unit:** **Practicum II**

**Level:** Three
**Duration:** 37 hours
Theory: 0 hours
Practical: 37 hours

**Overview:**

This unit is designed to provide practical experience with a variety of welding procedures.

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Perform assigned project tasks as determined in consultation with instructor.** | **100%** |

***

Apprenticeship Manitoba

# Welder

## Unit: A 4 Orientation II: Journeywork

**Level:** Three

**Duration:** 7 hours

Theory: 7 hours

Practical: 0 hours

**Overview:**

Level One, Unit A1 "Orientation I: Structure and Scope" gave an overview of the Welder trade, the Apprenticeship Manitoba Program, and the apprenticeship training system.

This unit further examines the Welder trade with a review of the trade regulation, certification and the journeyperson's responsibility for trade teaching. As the certified trade expert, the journeyperson's role is to train, supervise and mentor apprentices in the workplace.

Unit content will vary at the discretion of the instructor and experience of the apprentices.

**Objectives and Content:** **Percent of Unit Mark (%)**

**1. Describe the scope, substance, and significance of journey-level status.** **10%**

a. Historical background, including trainee experiences
- Origin, definition, and examples of journey-level status
- Obligations to employers, trade clients, and apprentices
- Concept of skills stewardship, and its rationale
- Customary responsibilities of journeyperson as workplace trainer/supervisor
- Overview development of formal systems for regulating/recognizing journey-level competence in designated apprenticeable trades
- Contributions of 'unticketed journeymen' and other informally-qualified Welders to workplace trade-learning
- Achievements/limitations of informal systems for workplace training
- Trends (e.g., succession planning in the trades; recognition of credentials and prior learning; defined standards for on-the-job trades education and training)

b. Regulatory/legal dimensions of journey-level status in designated trades
- Manitoba provincial requirements [e.g., *Apprenticeship and Certification Act; General Regulation*; the *Welder Trade Regulation*; relevant policies of the Apprenticeship and Certification Board]
- Trade-specific requirements re: practical training supervision and documentation; importance of quality assurance and broad-scope coverage of prescribed task-content; ratios, etc.

c. Other (as may be specified by instructor)

**2. Compare/contrast role-options and responsibilities of the supervising journeyperson.** **20%**

a. Recognizing the variability of supervision assignments, situations, and roles

b. Source and specification of the supervision assignment
c. Formal vs. informal roles (e.g., mandated by an employer's succession plan)
d. Implicit vs. explicit standards and content: training goals are/are not codified; assessment measures are/are not used,
e. Accountability for results: subject/not subject to third-party notification; completion of supervision assignment itself is/is not assessed by third party; journeyperson is/is not required to prepare performance evaluation that could affect apprentice's employability or wage-rate, etc.
f. General vs. task- or job-specific supervision assignments: e.g., scope of expectations re: content of supervisory task(s)
g. Long-term vs. short-run supervision assignments – e.g., considerable latitude/little latitude for apprentice to learn from mistakes
h. Formally vs. informally structured – e.g., supervision assignment is part of a prescribed cycle of assignments involving coordination among multiple journeypersons; apprentice is trained according to an individual training plan negotiated with employer
i. Typology of common supervisory role-options and what is implied by each:
   - Coach role: is often initiated by someone other than apprentice, and limited to a particular skill set, task, or production requirement
   - Mentor role : often initiated by apprentice, and relatively open-ended regarding content, duration, etc.
   - Peer role: typically involves individual upgrading or cross-training of one journeyperson by another; can include senior apprentice assisting less-experienced trade learner
   - Managerial role(s): can shade over into hire/fire issues as lead-hand or site-boss
   - Coordinator role: often a senior-level journeyperson appointed by an organization to assume responsibilities for monitoring progression of groups of apprentices
   - Other roles: may be improvised by journeyperson
j. Possibilities, perils, and likelihood of role-overlap in 'real-life' trade practice
k. Importance of clarifying all roles, expectations, and implications involved in accepting a supervision assignment
l. Role of Apprenticeship Training Coordinator (ATC), Apprenticeship Manitoba
m Resources for developing skills and knowledge re: providing journey-level supervision
   - Books and journals (not always trade-specific)
   - Websites
   - Conversation with trade instructors, journeypersons, and peers
   - Workshops
n. Other (as may be specified by instructor

**3. Describe/demonstrate common requirements re: providing journey-level supervision. 20%**

a. Review Unit A1 content re: challenges/opportunities opportunities of Apprenticeship learning adapted to journey-level supervision assignments and a journey-level standpoint
   - Application of adult education concepts to trades teaching/learning (e.g., responsibilities and expectations of adult learners)
   - Practical significance of 'styles' of adult learning and teaching
   - Helping apprentices to integrate technical training (in school) and practical training (on-the-job) learning experiences
   - Providing help and guidance re: new tasks and skills
   - Providing help and guidance re: fixing mistakes
   - Learning/teaching "the ropes" – socialization of learner within a community of trade practice (e.g., how to borrow a tool, interrupt a journeyperson, 'recruit' an advisor )
   - Coverage/documentation of prescribed tasks and subtasks (Welder POA),

including responsibility re: logbook sign-off (where applicable)
- Consultation with Apprenticeship Training Coordinator (ATC), Apprenticeship Manitoba
- Communicating with apprentices and employers about supervision assignments and assignment specifications, including the limits of the trainers' own responsibilities and competence (e.g., substance-abuse intervention)
- Benefits of maintaining a personal record of achievements, ideas, and needs as a workplace trainer

b. Individual reflection and guided group discussion re: personal experiences of workplace learning as an apprentice
- Identification of best and worst practices of supervising journeypersons
- Assessment of personal experiences (if any) to date in supervising, coaching, or guiding other people to learn or improve their skills (e.g., entry-level apprentices, members of athletic team, younger family members, etc.), and how this might compare/contrast with the journey-level support of apprenticeship learning
- Identification of workplace and other factors that can contribute to good and bad trades teaching/learning experiences
- Development of personal standards re: responsibility to share one's knowledge and skill with others in the workplace (e.g., use/misuse of humour, rigour, discretion, craft-pride, etc.)

c. Comparison/contrast of discussion results with current knowledge/resources re: workplace skills coaching methods as applicable to journey-level supervision assignments
- Qualities of a good workplace coach
- Components of workplace skills coaching
- Processes and recommended practices re: workplace coaching
- Troubleshooting problems re: supervision assignments

d. Other (as may be specified by instructor)

**4. Complete Modules 1 to 3, *Workplace Coaching Skills* (or equivalent). 25%**

a. Identifying purpose of the lesson
- Explaining the point of the lesson
- Role of the coach in specific coaching situation
- Other (specified by instructor)

b. Linking the lesson
- Learner needs
- Lesson sequence
- Focus on learner
- Selection/timing of coaching opportunities

c. Demonstration of skill/task to be learned
- Starting the coaching session
- Demonstration
- Hands-on trial
- Recap for learner

**5. Complete Modules 4 to 6, *Workplace Coaching Skills* (or equivalent). 25%**

a. Practice of skill/task to be learned
- Nature and importance of practice
- Setting up for learner practice
- Types of practice
- Recycling and reinforcing skill/task learning

b. Providing feedback to the learner
- Value of feedback
- Kinds of feedback
- Guidelines and tips

c. Assessment
   - Value of assessing learner progress
   - Assessing level of skill
   - Planning further steps toward skill/task mastery

***

Apprenticeship Manitoba

# Welder

## Unit: A11 Pre-IP Examination Review

**Level:** Three

**Duration:** 18 hours

Theory: 0 hours

Practical: 18 hours

**Overview:**

This unit offers senior Welder apprentices a systematic review of skills and knowledge required to pass the Inter-Provincial Examination. It promotes a purposeful personal synthesis between on-the-job learning and the content of in-school technical training. The unit includes information about the significance of Inter-Provincial certification and the features of the Inter-Provincial Examination. ***Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a 'Pass/Fail" grade will be recorded for the unit in its entirety.***

| **Objectives and Content:** | **Percent of Unit Mark (%)** |
|---|---|
| **1. Describe the significance, format and general content of Inter-Provincial Examinations for the trade of Welder.**<br>a. Scope and aims of certification; value of certifications<br>b. Obligations of candidates for Inter-Provincial certification<br>• Relevance of Inter-Provincial Examinations to current, accepted trade practices; industry-based provincial validation of test items<br>• Supplemental Policy (retesting)<br>• Confidentiality of examination content<br>c. Multiple-choice format (four-option) item format, Apprenticeship Manitoba standards for acceptable test items<br>d. Government materials relevant to the Certification Examinations for apprentice Welder<br>• Inter-Provincial Occupational Analysis (NOA); prescribed scope of the skills and knowledge which comprise the trade<br>• NOA "Pie-chart" and its relationship to content distribution of Inter-Provincial Examination items<br>• Apprenticeship Manitoba technical training package. | **n/a** |
| **2. Identify resources, strategies and other considerations for maximizing successful completion of written examinations.**<br>a. Personal preparedness<br>• Rest<br>• Nutrition<br>• Personal study regimen<br>• Prior experience in test situations (e.g., Unit Tests)<br>c. Self-assessment, consultation and personal study plan | **n/a** |

- Self-assessment of individual strengths/weaknesses in trade related skills and knowledge
- Approved textbooks
- Study groups

**3. Review program content regarding Occupational Skills. n/a**

**4. Review program content regarding Preparation for Welding Processes. n/a**

**5. Review program content regarding Cutting and Gouging. n/a**

**6. Review program content regarding Welding Processes. n/a**

*******