



Western Technical College

31442303 Welding - Shielded Metal Arc (SMAW)

Course Outcome Summary

Course Information

Description	The study of welding techniques and applications for the flat and horizontal positions, to include electrode selection, fundamental joints, welding positions, and basic electricity for arc welding.
Career Cluster	Manufacturing
Instructional Level	Technical Diploma Courses
Total Credits	2
Total Hours	72

Textbooks

No textbook required.

Learner Supplies

Welding sateen jacket, welding work gloves (long leather gauntlet, short leather work gloves), welding helmet, leather cape and sleeves. **Vendor:** To be discussed in class. Required.

Tools: 25' steel tape measure, metal combination square, and scribe. **Vendor:** To be discussed in class. Required.

Six-inch leather steel toed work boots - \$75.00-150.00. **Vendor:** To be discussed in class. Required.

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Enhance Personal Connections
2. Cultivate Passion: Expand a Growth-Mindset
3. Cultivate Passion: Increase Self-Awareness
4. Live Responsibly: Develop Resilience
5. Live Responsibly: Embrace Sustainability
6. Live Responsibly: Foster Accountability
7. Refine Professionalism: Act Ethically
8. Refine Professionalism: Improve Critical Thinking
9. Refine Professionalism: Participate Collaboratively
10. Refine Professionalism: Practice Effective Communication

Program Outcomes

1. Demonstrate industry recognized safety practices
2. Interpret welding drawings
3. Produce shielded metal arc welds (SMAW)
4. Perform thermal cutting

Course Competencies

1. Examine the fundamentals of shielded gas arc welding (SMAW).

Assessment Strategies

- 1.1. Written Product

Criteria

You will know you are successful when

- 1.1. you identify the basic hardware components of an SMAW equipment setup.
- 1.2. you describe how SMAW equipment components and electrodes, interact with base metal to deposit weld metal.
- 1.3. you describe the volt/amp curve for SMAW
- 1.4. you describe how electrode numbers, filler group designations, and weld positions relate to each other
- 1.5. you identify the 5 joint types

Learning Objectives

- 1.a. Explain the electrical concepts involved with SMAW.
- 1.b. Apply safety procedures in equipment setup and use.
- 1.c. Examine electrode classification.
- 1.d. Examine electrode selection for various applications.
- 1.e. Identify the different techniques needed for the common electrodes of E6010 and E7018.
- 1.f. Identify the various joint positions and joint preparations.
- 1.g. Identify appropriate techniques to prevent or minimize distortion.

2. Produce fillet welds in flat position for various joints using SMAW processes.

Assessment Strategies

- 2.1. Demonstration

Criteria

You will know you are successful when

- 2.1. you follow PPE and safety regulations.
- 2.2. you produce welds that meet the minimum acceptance criteria on 1F on joints.
- 2.3. you select the correct electrode.
- 2.4. you perform weld inspection.

Learning Objectives

- 2.a. Explore hand motion and weld puddle manipulation technique for SMAW.
- 2.b. Identify how work and travel angles influence the shape of the weld.
- 2.c. Describe how work and travel angles change depending on weld position and joint design.
- 2.d. Practice a variety of fillet welds using appropriate electrodes.
- 2.e. Practice multi-pass welds.

3. Produce groove welds in flat positions for various joints using SMAW processes.

Assessment Strategies

- 3.1. Demonstration

Criteria

You will know you are successful when

- 3.1. you follow PPE and safety regulations.
- 3.2. you select the correct electrode.
- 3.3. you produce welds that meet the minimum acceptance criteria on 1G on joints.
- 3.4. you perform weld inspection.

Learning Objectives

- 3.a. Explore hand motion and weld puddle manipulation technique for SMAW.
- 3.b. Identify how work and travel angles influence the shape of the weld.
- 3.c. Describe how work and travel angles change depending on weld position and joint design.
- 3.d. Practice a variety of groove welds using appropriate electrodes.
- 3.e. Practice multi-pass welds.

4. Produce fillet welds in horizontal position for various joints using SMAW processes.

Assessment Strategies

- 4.1. Demonstration

Criteria

You will know you are successful when

- 4.1. you follow PPE and safety regulations.
- 4.2. you select the correct electrode.
- 4.3. you produce welds that meet the minimum acceptance criteria on 2F on joints.
- 4.4. you perform weld inspection.

Learning Objectives

- 4.a. Explore hand motion and weld puddle manipulation technique for SMAW.
- 4.b. Identify how work and travel angles influence the shape of the weld.
- 4.c. Describe how work and travel angles change depending on weld position and joint design.
- 4.d. Practice a variety of fillet welds using appropriate electrodes.
- 4.e. Practice multi-pass welds.

5. Produce groove welds in horizontal positions for various joints using SMAW processes.

Assessment Strategies

- 5.1. Demonstration

Criteria

You will know you are successful when

- 5.1. you follow PPE and safety regulations.
- 5.2. you produce welds that meet the minimum acceptance criteria on 2G on joints.
- 5.3. you perform weld inspection.
- 5.4. you select the correct electrode.

Learning Objectives

- 5.a. Explore hand motion and weld puddle manipulation technique for SMAW.
- 5.b. Identify how work and travel angles influence the shape of the weld.
- 5.c. Describe how work and travel angles change depending on weld position and joint design.
- 5.d. Practice a variety of groove welds using appropriate electrodes.
- 5.e. Practice multi-pass welds.

6. Perform weld inspection.

Assessment Strategies

- 6.1. Demonstration

Criteria

You will know you are successful when

- 6.1. you will identify visual defects.
- 6.2. you take measurements for dimensional inspection.
- 6.3. you perform destructive testing.
- 6.4. you describe nondestructive testing techniques.

Learning Objectives

- 6.a. Identify any visual or surface defects.
- 6.b. Select measuring tools specific to welding.
- 6.c. Measure weld parts.
- 6.d. Apply destructive testing techniques that can be used for various welds.
- 6.e. Identify non destructive testing techniques.
- 6.f. Determine if weld can be repaired or re-done.