Western Technical College

31442316  Welding - Gas Metal Arc 2 (GMAW)

Course Outcome Summary

Course Information

Description  The study of welding techniques and applications of the gas metal arc welding process using the short circuiting arc process in the vertical and overhead positions as well as on pipe.

Career Cluster  Manufacturing

Instructional Level  Technical Diploma Courses

Total Credits  2
Total Hours  72

Textbooks


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 books - $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. Apply mathematical concepts.
2. Demonstrate ability to think critically.
3. Use effective communication skills.
4. Use technology effectively.

Program Outcomes

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

Course Competencies

1. **Explore Metal Transfers and Shielding Gases.**
   
   **Assessment Strategies**
   1.1. Written Objective Test
   
   **Criteria**

   You will know you are successful when:

   1.1. you explain the different modes of metal transfer and their applications.
   1.2. you identify type of gasses and their effect on the mode of transfer and application.
   1.3. you identify voltage, amperage, and gasses used in the joining of ferrous and non-ferrous metals.

   **Learning Objectives**

   1.a. Explore the modes of metal transfer.
   1.b. Examine the effects and applications of shielding gasses used in welding.
   1.c. Identify types gasses used in welding.
   1.d. Examine the volt/ampere relationship related to the use of various gasses.
   1.e. Review types of ferrous and non-ferrous metals.

2. **Weld 3F T joint in the uphill progression with two passes; First 1/4” root, Second 3/8” weave cover.**

   **Assessment Strategies**
   2.1. Skill Demonstration
   
   **Criteria**

   You will know you are successful when:

   2.1. you reference the WPS guidelines.
   2.2. you locate correct material thickness and shear to size.
   2.3. you meet weld quality as per AWS D1.1 or D1.3.
   2.4. you wear PPE and follow all safety guidelines.
   2.5. you set up, shut down, and maintain equipment and work area.
   2.6. you adjust, re-do, and complete welds after feedback, if necessary.

   **Learning Objectives**

   2.a. Illustrate the parts of the weld, including the angles and how they are measured.
   2.b. Explore techniques to achieve the desired weld.
   2.c. Identify the application of the weld.
   2.d. Examine the acceptance criteria for a completed weld.

3. **Weld 3F T joint in the downhill progression with three single bead passes, completed weld 3/8”.**

   **Assessment Strategies**
   3.1. Skill Demonstration
   
   **Criteria**

   You will know you are successful when:

   3.1. you set up, shut down, and maintain equipment and work area.
   3.2. you wear PPE and follow all safety guidelines.
   3.3. you meet weld quality as per AWS D1.1 or D1.3.
   3.4. you locate correct material thickness and shear to size.
   3.5. you reference the WPS guidelines.
   3.6. you adjust, re-do, and complete welds after feedback, if necessary.

   **Learning Objectives**
3.a. Illustrate the parts of the weld, including the angles and how they are measured.
3.b. Explore techniques to achieve the desired weld.
3.c. Identify the application of the weld.
3.d. Examine the acceptance criteria for a completed weld.

4. **Weld 3G Single V groove, multipass uphill progression with backing. 2-3 passes. Weave cover.**

**Assessment Strategies**

4.1. **Skill Demonstration**

**Criteria**

*You will know you are successful when:*

4.1. you reference the WPS guidelines.
4.2. you locate correct material thickness and shear to size.
4.3. you meet weld quality as per AWS D1.1 or D1.3.
4.4. you wear PPE and follow all safety guidelines.
4.5. you set up, shut down, and maintain equipment and work area.
4.6. you adjust, re-do, and complete welds after feedback, if necessary.

**Learning Objectives**

4.a. Illustrate the parts of the weld, including the angles and how they are measured.
4.b. Explore techniques to achieve the desired weld.
4.c. Identify the application of the weld.
4.d. Examine the acceptance criteria for a completed weld.

5. **Weld 3G Single V groove multipass, open root, uphill progression.**

**Assessment Strategies**

5.1. **Skill Demonstration**

**Criteria**

*You will know you are successful when:*

5.1. you reference the WPS guidelines.
5.2. you locate correct material thickness and shear to size.
5.3. you meet weld quality as per AWS D1.1 or D1.3.
5.4. you wear PPE and follow all safety guidelines.
5.5. you set up, shut down, and maintain equipment and work area.
5.6. you adjust, re-do, and complete welds after feedback, if necessary.

**Learning Objectives**

5.a. Illustrate the parts of the weld, including the angles and how they are measured.
5.b. Explore techniques to achieve the desired weld.
5.c. Identify the application of the weld.
5.d. Examine the acceptance criteria for a completed weld.

6. **Weld 4F T joint, 3 pass, 3/8" fillet.**

**Assessment Strategies**

6.1. **Skill Demonstration**

**Criteria**

*You will know you are successful when:*

6.1. you reference the WPS guidelines.
6.2. you locate correct material thickness and shear to size.
6.3. you meet weld quality as per AWS D1.1 or D1.3.
6.4. you wear PPE and follow all safety guidelines.
6.5. you set up, shut down, and maintain equipment and work area.
6.6. you adjust, re-do, and complete welds after feedback, if necessary.

**Learning Objectives**

6.a. Illustrate the parts of the weld, including the angles and how they are measured.
6.b. Explore techniques to achieve the desired weld.
6.c. Identify the application of the weld.
6.d. Examine the acceptance criteria for a completed weld.

7. **Weld 4G V groove, multipass open root.**
   Assessment Strategies
   7.1. Skill Demonstration
   
   **Criteria**
   *You will know you are successful when:*
   7.1. you reference the WPS guidelines.
   7.2. you locate correct material thickness and shear to size.
   7.3. you meet weld quality as per AWS D1.1 or D1.3.
   7.4. you wear PPE and follow all safety guidelines.
   7.5. you set up, shut down, and maintain equipment and work area.
   7.6. you adjust, re-do, and complete welds after feedback, if necessary.
   
   **Learning Objectives**
   7.a. Illustrate the parts of the weld, including the angles and how they are measured.
   7.b. Explore techniques to achieve the desired weld.
   7.c. Identify the application of the weld.
   7.d. Examine the acceptance criteria for a completed weld.

8. **Explore the use of the GMAW process in pipe welding.**
   Assessment Strategies
   8.1. Skill Demonstration
   
   **Criteria**
   *You will know you are successful when:*
   8.1. you weld three pipe positions.
   8.2. you reference the WPS guidelines.
   8.3. you locate correct material thickness and shear to size.
   8.4. you meet weld quality as per AWS D1.1 or D1.3.
   8.5. you wear PPE and follow all safety guidelines.
   8.6. you set up, shut down, and maintain equipment and work area.
   8.7. you adjust, re-do, and complete welds after feedback, if necessary.
   
   **Learning Objectives**
   8.a. Explore the application of GMAW in pipe welding.
   8.b. Explore the techniques to achieve the desired weld.
   8.c. Examine the acceptance criteria for a completed weld.
   8.d. Illustrate the parts of the weld, including the angles and how to apply them.

9. **Weld 2G multipass, sch 40 open root pipe.**
   Assessment Strategies
   9.1. Skill Demonstration
   
   **Criteria**
   *You will know you are successful when:*
   9.1. you reference the WPS guidelines.
   9.2. you locate correct material thickness and shear to size.
   9.3. you meet weld quality as per AWS D1.1 or D1.3.
   9.4. you wear PPE and follow all safety guidelines.
   9.5. you set up, shut down, and maintain equipment and work area.
   9.6. you adjust, re-do, and complete welds after feedback, if necessary.
   
   **Learning Objectives**
   9.a. Illustrate the parts of the weld, including the angles and how they are measured.
   9.b. Explore techniques to achieve the desired weld.
   9.c. Identify the application of the weld.
   9.d. Examine the acceptance criteria for a completed weld.

Assessment Strategies
10.1. Skill Demonstration

Criteria
You will know you are successful when:
10.1. you reference the WPS guidelines.
10.2. you locate correct material thickness and shear to size.
10.3. you meet weld quality as per AWS D1.1 or D1.3.
10.4. you wear PPE and follow all safety guidelines.
10.5. you set up, shut down, and maintain equipment and work area.
10.6. you adjust, re-do, and complete welds after feedback, if necessary.

Learning Objectives
10.a. Illustrate the parts of the weld, including the angles and how they are measured.
10.b. Explore techniques to achieve the desired weld.
10.c. Identify the application of the weld.
10.d. Examine the acceptance criteria for a completed weld.


Assessment Strategies
11.1. Skill Demonstration

Criteria
You will know you are successful when:
11.1. you reference the WPS guidelines.
11.2. you locate correct material thickness and shear to size.
11.3. you meet weld quality as per AWS D1.1 or D1.3.
11.4. you wear PPE and follow all safety guidelines.
11.5. you set up, shut down, and maintain equipment and work area.
11.6. you adjust, re-do, and complete welds after feedback, if necessary.

Learning Objectives
11.a. Illustrate the parts of the weld, including the angles and how they are measured.
11.b. Explore techniques to achieve the desired weld.
11.c. Identify the application of the weld.
11.d. Examine the acceptance criteria for a completed weld.