



Course Outcome Summary

31442303 Welding-Shielded Metal Arc (SMAW)

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.
- Instruction Level:** Technical Diploma
- Total Credits:** 2.00
- Total Hours:** 72.00
- Textbooks:** *Modern Welding*. 11th Edition. Copyright 2013. Althouse, Andrew D., Carl H. Turnquist, William A. Bowditch, and Kevin E. Bowditch. Publisher: Goodheart-Wilcox Co. ISBN-13:978-1-60525-795-2. Required.
- Core Abilities:**
1. Apply mathematical concepts.
 2. Demonstrate ability to think critically.
 3. Demonstrate ability to value self and work ethically with others in a diverse population.
 4. Make decisions that incorporate the importance of sustainability.
 5. Transfer social and natural science theories into practical applications.
 6. Use effective communication skills.
 7. Use technology effectively.
- Supplies Needed:**
- 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.
- Safety glasses with side eye protection that meet Z87 OSHA guidelines. Vendor: Campus Shop. Required. Six inch leather steel toed work boots - \$75.00-150.00. Vendor: To be discussed in class. Required.
- Program Outcomes:**
1. Demonstrate industry recognized safety practices
 2. Interpret welding drawing
 3. Produce shielded metal arc welds (SMAW)

Course Competencies:

1. Identify the basics of Shielded Metal Arc Welding

Domain Cognitive Level Analyzing Status Active

Linked Core Abilities

Demonstrate ability to think critically. Demonstrate ability to value self and work ethically with others in a diverse population. Transfer social and natural science theories into practical applications. Use effective communication skills.

Linked Program Outcomes

Demonstrate industry recognized safety practices
Interpret welding drawings

Assessment Strategies

1.1. Written Product

Criteria

Performance will be satisfactory when:

- 1.1. -Listen attentively
- 1.2. -Pass written exam at level as determined by the instructor
- 1.3. -Follow the criteria on all products as outlined by the instructor
- 1.4. -Provide accurate feedback to questions/scenarios

Learning Objectives

- 1.a. Enumerate the basic hardware components of an SMAW equipment setup
- 1.b. Articulate how SMAW equipment components and electrodes, interact with base metal to deposit weld metal
- 1.c. State the meanings of the letters SMAW

2. Explain the electrical concepts involved with shielded metal arc welding

Domain Cognitive Level Analyzing Status Active

Linked Core Abilities

Apply mathematical concepts. Demonstrate ability to think critically. Demonstrate ability to value self and work ethically with others in a diverse population. Transfer social and natural science theories into practical applications. Use effective communication skills.

Linked Program Outcomes

Demonstrate industry recognized safety practices
Interpret welding drawings

Assessment Strategies

2.1. Written Product

Criteria

Performance will be satisfactory when:

- 2.1. -Listen attentively
- 2.2. -Pass written exam at level as determined by the instructor
- 2.3. -Follow the criteria as outlined on all products as outlined by the instructor
- 2.4. -Provide accurate feedback to questions/ scenarios

Learning Objectives

- 2.a. Examine the volt/amp curve for SMAW
- 2.b. Examine how welding technique affects voltage and amperage
- 2.c. Examine the meaning of duty cycle
- 2.d. Examine the causes and responses to arc blow

3. Apply safety procedures in equipment setup and use
Domain Psychomotor Level Imitating Status Active
Linked Core Abilities

Apply mathematical concepts. Demonstrate ability to think critically. Demonstrate ability to value self and work ethically with others in a diverse population. Make decisions that incorporate the importance of sustainability. Transfer social and natural science theories into practical applications. Use effective communication skills.
Use technology effectively.

Linked Program Outcomes

Demonstrate industry recognized safety practices

Assessment Strategies

3.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 3.1. -Listen attentively
- 3.2. -Pass written exam at level as determined by the instructor
- 3.3. -Follow the criteria on all products as outlined by the instructor
- 3.4. -Provide accurate feedback to questions/scenarios

Learning Objectives

- 3.a. -Listen to and observe a demonstration attentively
- 3.b. -Follow the criteria and produce acceptable work as demonstrated by the instructor
- 3.c. -Provide accurate feedback to questions/ scenarios

4. Examine electrode selection for various applications
Domain Cognitive Level Analyzing Status Active
Linked Core Abilities

Apply mathematical concepts. Demonstrate ability to think critically. Demonstrate ability to value self and work ethically with others in a diverse population. Make decisions that incorporate the importance of sustainability. Transfer social and natural science theories into practical applications. Use effective communication skills. Use technology effectively.

Linked Program Outcomes

Interpret welding drawings

Produce shielded metal arc welds (SMAW)

Assessment Strategies

4.1. Written Product

Criteria

Performance will be satisfactory when:

- 4.1. -Listen attentively
- 4.2. -Pass written exam at level as determined by the instructor
- 4.3. -Follow the criteria as outlined on all products as outlined by the instructor
- 4.4. -Provide accurate feedback to questions/ scenarios

Learning Objectives

- 4.a. Examine the 4 filler groups
- 4.b. Recite what the alpha-numeric meanings are of the EXXXX designations are
- 4.c. Examine how electrode numbers, filler group designations, and weld positions relate to each other
- 4.d. Recite the specific application(s) of low hydrogen electrodes, and how they must be stored to be effective

5. Identify the various joint positions and joint preparations

Domain Cognitive Level Analyzing Status Active

Linked Core Abilities

Apply mathematical concepts. Demonstrate ability to think critically. Demonstrate ability to value self and work ethically with others in a diverse population. Transfer social and natural science theories into practical applications.
Use effective communication skills.

Assessment Strategies

5.1. Written Product

Criteria

Performance will be satisfactory when:

- 5.1. -Listen attentively
- 5.2. -Pass written exam at level as determined by the instructor
- 5.3. -Follow the criteria as outlined on all products as outlined by the instructor
- 5.4. -Provide accurate feedback to questions/ scenarios

Learning Objectives

- 5.a. Examine the 5 joint types
- 5.b. Identify names for various joint preparations
- 5.c. sketch various joints in the 4 welding positions
- 5.d. Examine the difference between a joint type and a weld type

6. Identify appropriate techniques to prevent or minimize distortion

Domain Cognitive Level Analyzing Status Active

Linked Program Outcomes

Demonstrate industry recognized safety practices
Produce shielded metal arc welds (SMAW)

Assessment Strategies

6.1. Written Product

Criteria

Performance will be satisfactory when:

- 6.1. -Listen to and observe a demonstration attentively
- 6.2. -Follow the criteria and produce acceptable work as demonstrated by the instructor
- 6.3. -Provide accurate feedback to questions/ scenarios
- 6.4. -Provide accurate feedback to questions/scenarios

Learning Objectives

- 6.a. Listen attentively
- 6.b. Pass written exam at level as determined by the instructor
- 6.c. Follow the criteria as outlined on all products as outlined by the instructor
- 6.d. Provide accurate feedback to questions/scenario

7. Apply appropriate techniques that produce acceptable smaw welds in the flat and horizontal positions with various electrodes as stated in the Department Job Book

Domain Psychomotor Level Imitating Status Active

Linked Core Abilities

Demonstrate ability to think critically.
Demonstrate ability to value self and work ethically with others in a diverse population. Make decisions that incorporate the importance

of sustainability.
Transfer social and natural science theories into practical applications. Use technology effectively.

Linked Program Outcomes

Demonstrate industry recognized safety practices
Interpret welding drawings
Produce shielded metal arc welds (SMAW)

Assessment Strategies

7.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 7.1. -Listen to and observe a demonstration attentively
- 7.2. -Follow the criteria and produce acceptable work as demonstrated by the instructor
- 7.3. -Provide accurate feedback to questions/ scenarios

Learning Objectives

- 7.a. Demonstrate use of E6013, E6010, and E7018 to stringer beads, weave beads, square groove joints, and lap joints in the flat position
- 7.b. Demonstrate use of E6010, E6011, E7018, and E7024 to groove, and T-joints in the horizontal position.

