**Course Information**

<table>
<thead>
<tr>
<th>Division</th>
<th>Industrial Technology Education</th>
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<tbody>
<tr>
<td>Course Number</td>
<td>WLD 260</td>
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<tr>
<td>Title</td>
<td>Flux Cored Arc and Gas Metal Arc Welding</td>
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<tr>
<td>Credits</td>
<td>3</td>
</tr>
<tr>
<td>Developed by</td>
<td>Carlton Penn</td>
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<tr>
<td>Lecture/Lab Ratio</td>
<td>1 Lecture/4 Lab</td>
</tr>
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<tr>
<th>Transfer Status</th>
<th>ASU</th>
<th>NAU</th>
<th>UA</th>
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<tbody>
<tr>
<td></td>
<td>Non-transferable</td>
<td>CTE Departmental Elective</td>
<td>Non-transferable</td>
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| Activity Course               | No                           |
| CIP Code                      | 48.0508                      |
| Assessment Mode               | Pre/Post Test (20 Questions/100 Points) |
| Semester Taught               | Spring                       |
| GE Category                   | None                         |
| Separate Lab                  | No                           |
| Awareness Course              | No                           |
| Intensive Writing Course      | No                           |

**Prerequisites**

WLD 101 or WLD 108 or instructor approval

**Educational Value**

For advanced students pursuing the Welding Technology Certificate or current workers upgrading skills.

**Description**

This course teaches flux cored arc welding (FCAW) and gas metal arc welding (GMAW) principles and techniques. Course includes metal preparation processes, equipment set-up, and welding techniques related to different metal types and welding positions. This course helps prepare students for American Welding Society (AWS) entry-level certifications.

**Supplies**

None
Competencies and Performance Standards

1. Operate all shop welding equipment safely and effectively
   **Learning objectives**
   *What you will learn as you master the competency:*
   a. List all of the safety rules which apply in the welding shop.
   b. Alert to situations which produce specific hazards in the welding environment.
   c. Identify the causes of accidents in case studies and describe a procedure which would have eliminated these accidents.
   d. Develop the habits of working safely in all situations.

   **Performance Standards**
   *Competence will be demonstrated:*
   o in lab activities
   *Criteria - Performance will be satisfactory when:*
   o learner works safely and uses appropriate safety gear with each piece of welding equipment
   o learner sets up all of the welding equipment correctly for the welding conditions

2. Prepare high quality welds using the MIG process.
   **Learning objectives**
   *What you will learn as you master the competency:*
   a. Describe the spray transfer, globular transfer, and short arc MIG processes.
   b. Define the parameters of MIG welding and explain the proper machine settings for different welding conditions.
   c. List the different types of filler wire which are available and describe their proper application.
   d. Demonstrate the procedures for MIG welding on both sheet metal and heavy plate.
   e. Evaluate the strength of the MIG welded joint by visual inspection.

   **Performance Standards**
   *Competence will be demonstrated:*
   o in projects and lab activities
   *Criteria - Performance will be satisfactory when:*
   o learner effectively uses wire feed welding machines to complete assigned projects
   o learner demonstrates correct machine settings for specific weld conditions
   o learner demonstrates the correct methods for installing MIG wire, rollers, and torch tip components

3. Practice standard shop procedures to minimize distortion in MIG welding.
   **Learning objectives**
   *What you will learn as you master the competency:*
   a. Describe the causes of distortion in welding of all kinds.
   b. List the procedures which can be used to minimize the distortion.
   c. Show the application of tack welds and welding fixtures to minimize distortion.
   d. Demonstrate peening techniques which can be used to reduce distortion in a weld.
Performance Standards

Competence will be demonstrated:
- in lab activities
- in written tests

Criteria - Performance will be satisfactory when:
- learner demonstrates the correct placement of tack welds to prepare for thorough welding and minimize distortion
- learner can build a welding fixture that will effectively control distortion in a Tee welded segment
- learner can demonstrate the correct use of electrodes to minimize distortion
- learner effectively uses pre and post heating, peening and back stepping techniques in completing assigned projects

4. Demonstrate welding test methods.

Learning objectives
What you will learn as you master the competency:
- a. Describe the procedures which are commonly used to test welds.
- b. Evaluate the strength of a weld by tensile testing.
- c. Evaluate the strength of a weld by clip tests and by burning through the weld joint.
- d. Apply the guided bend test to welded test coupons.
- e. Prepare a weld plate to be sent off for x-ray testing.
- f. List the items to be aware of in visual inspection of a weld.

Performance Standards

Competence will be demonstrated:
- in written tests
- in lab activities and assignments

Criteria - Performance will be satisfactory when:
- learner prepares test coupons according to AWS specifications
- learner can describe the appearance of a sound weld
- learner can identify defects in weld samples
- learner demonstrates an ability to use the guided bend test correctly
- learner uses penetrant inspection methods to identify hidden flaws

Types of Instruction

Classroom Presentation
Computer Lab

Grading Information

Grading Rationale

Students are graded on 4 things: chapter tests, shop projects, final exam (30%), and attendance (10%).
Grading Scale

A  90% - 100%
B  80% - 89%
C  70% - 79%
D  60% - 69%
F  Below 60 %