



## Course Outline

2026-2027 Catalog

### WLD 18 - Beginning Industrial Welding

#### Catalog Description

**Transfer Status:** CSU

**Unit(s):** 2.00

**Course Description:** In this course, students will be introduced to welding and cutting processes applicable to the heavy equipment industry. The course includes oxyacetylene cutting (OFC-A), plasma arc cutting (PAC), air carbon arc cutting and gouging (CAC-A), shielded metal arc welding (SMAW), gas metal arc welding (GMAW) processes, and flux cored arc welding (FCAW) processes, in the flat, horizontal and vertical positions on various joint details. It will also include safety procedures, electrode identification, joint fit-up and alignment, base metal preparation, weld quality, beads and fillet welds, with focus on theory and practice. All welds will be based on the American Welding Society (AWS) standards. Pass/No Pass.

#### Objectives

Upon successful completion of this course, the student should be able to:

1. Demonstrate the proper use and set up of the oxy-fuel cutting (OFC) units in a safe manner.
2. Demonstrate the proper use and set up of the plasma arc cutting (PAC) unit in a safe manner.
3. Demonstrate the proper use of the air carbon arc cutting and gouging (CAC-A) unit in a safe manner.
4. Operate the SMAW units to weld in the flat, horizontal, and vertical positions.
5. Operate the GMAW units to weld in the flat, horizontal, and vertical positions.
6. Operate the FCAW units to weld in the flat, horizontal, and vertical positions.
7. Demonstrate proper hardfacing techniques utilizing SMAW and FCAW processes.
8. Demonstrate proper base metal, beads and fillet welds procedures per requirements set by the AWS.
9. Identify and use the AWS classification of electrodes in selecting the correct electrode for the job.

#### Course Content

##### Topic Titles / Suggested Time Topic

##### Lecture/Activity

| <u>Topics</u>               | <u>Lec Hrs</u> | <u>Act Hrs</u>    |
|-----------------------------|----------------|-------------------|
| Introduction and safety     |                | 4.00              |
| Flame Cutting               |                | 2.00              |
| PAC                         |                | 2.00              |
| Base Metal Preparation      |                | 1.00              |
| Joint fit-up and Alignment  |                | 1.00              |
| SWAW Equipment and Setup    |                | 2.00              |
| SMAW Electrodes             |                | 1.00              |
| SMAW Beads and Fillet Welds |                | 3.00              |
| Weld Quality                |                | 3.00              |
| GMAW Equipment and Setup    |                | 2.00              |
| GMAW Beads and Fillet Welds |                | 2.00              |
| FCAW Equipment and Setup    |                | 2.00              |
| FCAW Beads and Fillet Welds |                | 3.00              |
| Hard Facing                 |                | 4.00              |
| CAC-A                       |                | 2.00              |
| <b>Total Hours:</b>         |                | <b>0.00 34.00</b> |

##### Lab

| <u>Topics</u>              | <u>Lab Hrs</u> |
|----------------------------|----------------|
| Introduction and Safety    | 1.00           |
| Flame Cutting              | 4.00           |
| PAC                        | 2.00           |
| Base Metal Preparation     | 4.00           |
| Joint Fit-Up and Alignment | 2.00           |
| SMAW Equipment and Setup   | 2.00           |
| SMAW Electrodes            | 2.00           |

| <b>Topics</b>               | <b>Lab Hrs</b> |
|-----------------------------|----------------|
| SMAW Beads and Fillet Welds | 6.00           |
| Weld Quality                | 2.00           |
| GMAW Equipment and Setup    | 3.00           |
| GMAW Beads and Fillet Welds | 6.00           |
| FCAW Equipment and Setup    | 3.00           |
| FCAW Beads and Fillet Welds | 6.00           |
| Hard Facing                 | 6.00           |
| CAC-A                       | 2.00           |

**Total Hours: 51.00**

### Methods of Instruction

- A. Class Activities
- B. Demonstrations
- C. Discussion
- D. Homework: Students are required to complete one hour of outside-of-class homework for every two hours of activity
- E. Lecture
- F. Problem-Solving Sessions

### Methods of Evaluation

- A. Exams/Tests
- B. Homework
- C. Class participation
- D. Lab Projects
- E. Written Assignments
- F. Practical Evaluations

### Examples of Assignments

#### Reading Assignments

1. Read Module 1 and be prepared to discuss in class.
2. Read assigned AWS journal article and be prepared to discuss in class.

#### Writing Assignments

1. Write a 1-2 page essay explaining how the assigned AWS article can be implemented into the process and how it relates to the class.
2. Describe an order of operations for SMAW equipment setup in a 1-2 page paper.

#### Out-of-Class Assignments

1. Research the proper process for setting up OAW equipment using manufactures publication.
2. Answer review questions for Module 2.

### Recommended Materials of Instruction

National Center for Construction Education and Research (NCCER). (2023). Welding, Level 1. *Pearson, 6th*. 9780137924530.

#### Other Learning Materials

Tools: Chipping hammer, wire brush, 10 in. straight jaw locking pliers, combination square, silver pencil and soap stone. Safety equipment: Safety glasses, welders cap, leather gauntlet gloves, leather welding jacket, leather chaps, leather shoes, and proper protective clothing (no tennis shoes, tank tops, or shorts).

### Minimum Qualifications

Welding

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