



Course Outline

2026-2027 Catalog

WLD 24 - Shielded Metal Arc Welding (Stick Electrode)

Catalog Description

Transfer Status: CSU

Prerequisite: WLD 21 and NCCER Level Welding I Qualification

Unit(s): 8.00

Lecture: 34.00 Contact hours/68.00 Out of class hours/102.00 Total hours/2.00 Unit(s)

Lab: 306.00 Contact hours/0.00 Out of class hours/306.00 Total hours/6.00 Unit(s)

Total: 340.00 Contact hours/68.00 Out of class hours/408.00 Total hours/8.00 Unit(s)

Course Description: This course includes pre-employment training for welding technicians. Emphasis on developing manipulative proficiency in the use of shielded metal arc welding (SMAW), gas metal arc welding (GMAW), and flux core arc welding (FCAW), in the flat, horizontal, vertical, and overhead positions. These welding processes will be applied to light and heavy gauge plate steel for light construction. Part of the Level Two welder qualification for American Welding Society (AWS).

Objectives

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

1. Apply safety skills, theory and practices used in the SMAW, GMAW and FCAW processes.
2. Demonstrate the proper use and set up of the SMAW, GMAW and FCAW processes.
3. Demonstrate the proper welding processes of bead pads, tees, and groove weld details per qualification procedures set by the AWS.
4. Demonstrate proper joint fit-up and alignment.
5. Demonstrate proper base metal, beads and fillet welds qualification procedures per requirements set by the AWS.
6. Identify and use the American Welding Society (AWS) classification of electrodes in selecting the correct filler materials for the job.
7. Classify carbon steel electrodes and wires by using manufactures manuals and welding with them.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Introduction and safety	2.00
Basic joint and weld and base metal preparation	4.00
Five tools a welder controls, workmanship and worker habits	2.00
Reading welding detail drawings	2.00
Positions of welding plate	4.00
Introduction to welding symbols	2.00
Carbon steel electrodes and wires classification	4.00
Weld defects	3.00
Welder inspection and testing	2.00
Physical characteristics and mechanical properties of metals	2.00
Set up and operation of GMAW equipment	2.00
Set up and operation of FCAW equipment	1.50
Set up and operation of SMAW equipment	2.00
Preheating and post heating of metals	1.50

Total Hours: 34.00

Lab

<u>Topics</u>	<u>Lab Hrs</u>
Basic joint and weld and base metal preparation	75.00
Five tools a welder controls, workmanship and worker habits	45.00
Reading welding detail drawings	14.00
Positions of welding plate	25.00
Introduction to welding symbols	25.00
Carbon steel electrodes and wires classification	10.00
Weld defects	20.00
Welder inspection and testing	11.00

Topics	Lab Hrs
Physical characteristics and mechanical properties of metals	10.00
Set up and operation of GMAW equipment	12.50
Set up and operation of FCAW equipment	12.50
Introduction and safety	5.00
Set up and operation of SMAW equipment	30.00
Preheating and post heating of metals	11.00
Total Hours: 306.00	

Methods of Instruction

- A. Discussion
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- C. Instructor Demonstrations
- D. Laboratory Experiments
- E. Lecture

Methods of Evaluation

- A. Exams/Tests
- B. Homework
- C. Lab Projects
- D. Lab Final/Mid-term Project

Examples of Assignments

Reading Assignments

1. Read module 3 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 500-word 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 setup of an SVOG welding joint.

Out-of-Class Assignments

1. Research the proper process for setting up FCAW equipment using manufactures publication.
2. Answer review questions for module 4. Research the proper process for setting up FCAW equipment using manufacturer's publication.

Recommended Materials of Instruction

National Center for Construction Education and Research (NCCER). (2025). Welding Level Two. *Pearson, 6th*. 9780138216160.
National Center for Construction Education and Research (NCCER). (2023). Welding Level One. *Pearson, 6th*. 9780137924530.

Other Learning Materials

All tools listed in the Full-Time Welding Program Semester 1 tool list on the Butte College Welding Technology website.

Minimum Qualifications

Welding

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