



Course Outline

2026-2027 Catalog

WLD 21 - Intermediate Welding

Catalog Description

Transfer Status: CSU

Prerequisite: WLD 20

Unit(s): 4.00

Lecture: 17.00 Contact hours/34.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Lab: 153.00 Contact hours/0.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

Total: 170.00 Contact hours/34.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

Course Description: In this course students will perform welds in positions other than flat and horizontal. The content will enhance the ability of the students to perform welds out of position. The course includes welding safety, shielded metal arc welding (SMAW), gas metal arc welding (GMAW), plasma arc cutting (PAC), air carbon arc cutting and gouging (CAC-A) welding and cutting processes. These welds will be performed in the flat, horizontal, vertical, and overhead positions. It will also include base metal, shielded metal arc welding electrodes, joint fit-up and alignment, groove welds with backing, and open V-groove welds. All welds will meet the American Welding Society (AWS) qualification standards.

Objectives

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

1. Safely operate the SMAW units to weld in the flat, horizontal, vertical and overhead positions.
2. Demonstrate proper joint fit-up and alignment.
3. Demonstrate proper base metal, beads and fillet welds qualification procedures per requirements set by the AWS.
4. Demonstrate proper welding process of groove welds (with backing and open) per qualification procedures set by the AWS.
5. Demonstrate the use of the PAC units in a safe manner.
6. Demonstrate the use of the CAC-A unit in a safe manner.
7. Safely operate the GMAW units, to weld in the flat, horizontal, vertical positions.
8. Identify and use the AWS classification of electrodes in selecting the correct electrode for the job.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Introduction and safety	2.00
SMAW equipment and setup	1.50
PAC	1.00
CAC-A	1.00
Base metal preparation	1.00
Weld quality	1.50
SMAW electrodes	1.00
Joint fit-up and alignment	1.00
SMAW groove welds with backing	2.00
SMAW open V-groove welds	1.00
GMAW equipment setup and operation	1.00
GMAW	1.00
Flame cutting	1.00
SMAW beads and fillet welds	1.00
Total Hours:	
17.00	

Lab

<u>Topics</u>	<u>Lab Hrs</u>
Introduction and safety	1.00
SMAW equipment and setup	10.00
PAC	6.00
CAC-A	6.00
Base metal preparation	7.00

Topics	Lab Hrs
Weld quality	8.00
SMAW electrodes	8.00
Joint fit-up and alignment	8.00
SMAW groove welds with backing	25.00
SMAW open V-groove welds	35.00
GMAW equipment setup and operation	7.00
GMAW	7.00
Flame cutting	10.00
SMAW beads and fillet welds	15.00
Total Hours: 153.00	

Methods of Instruction

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

Methods of Evaluation

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

Examples of Assignments

Reading Assignments

1. Read assigned AWS journal article and be prepared to discuss in class.
2. Read module 1 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 equipment setup.

Out-of-Class Assignments

1. Research the proper process for setting up GMAW equipment using manufactures publication.
2. Answer review questions for module 3.

Recommended Materials of Instruction

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

Other Learning Materials

All tools and PPE listed for WLD 21 on the Butte College Welding Technology website.

Minimum Qualifications

Welding

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