BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

WLD 21 - Intermediate Welding **4 Unit(s)**

Prerequisite(s): WLD 20
Recommended Prep: Reading Level III; English Level II; Math Level II
Transfer Status: CSU
17 hours Lecture
153 hours Lab

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.

II. **OBJECTIVES**

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

A. Operate the SMAW units to weld in the flat, horizontal, vertical and overhead positions.
B. Demonstrate proper joint fit-up and alignment.
C. Demonstrate proper base metal, beads and fillet welds qualification procedures per requirements set by the AWS.
D. Demonstrate proper welding process of groove welds (with backing and open) per qualification procedures set by the AWS.
E. Demonstrate the use of the PAC units in a safe manner.
F. Demonstrate the use of the CAC-A unit in a safe manner.
G. Operate the GMAW units, to weld in the flat, horizontal, vertical positions.
H. Identify and use the AWS classification of electrodes in selecting the correct electrode for the job.

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

Topics		Hours
1.	Introduction and safety	2.00
2.	Flame cutting	1.00
3.	SMAW equipment and setup	1.50
4.	PAC	1.00
5.	CAC-A	1.00
6.	Base metal preparation	1.00
7.	Weld quality	1.50
8.	SMAW electrodes	1.00
9.	Joint fit-up and alignment	1.00
10.	SMAW beads and fillet welds	1.00

11.	SMAW groove welds with backing	2.00
12.	SMAW open V-grove welds	1.00
13.	GMAW equipment setup and operation	1.00
14.	GMAW	1.00
Total Hours		17.00

Lab

Topics		Hours
1.	Introduction and safety	1.00
2.	Flame cutting	10.00
3.	SMAW equipment and setup	10.00
4.	PAC	6.00
5.	CAC-A	6.00
6.	Base metal preparation	7.00
7.	Weld quality	8.00
8.	SMAW electrodes	8.00
9.	Joint fit-up and alignment	8.00
10.	SMAW beads and fillet welds	15.00
11.	SMAW groove welds with backing	25.00
12.	SMAW open V-groove welds	35.00
13.	GMAW equipment setup and operation	7.00
14.	GMAW	7.00
Total Hours		153.00

IV. **METHODS OF INSTRUCTION**

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

V. **METHODS OF EVALUATION**

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

VI. **EXAMPLES OF ASSIGNMENTS**

A. Reading Assignments
    1. Read module 1 and be prepared to discuss in class.
    2. Read assigned AWS journal article and be prepared to dicuss in class.

B. Writing Assignments
    1. Write an 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.
    3. Describe an order of operations for SMAW equipment setup.

C. Out-of-Class Assignments
    1. Answer review questions for module 3.
    2. Research the proper process for setting up GMAW equipment using manufactures publication.

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

A. National Center for Construction Education and Research (NCCER). Welding Level One. 4th Edition. Pearson Education INC, 2010.

Materials Other Than Textbooks:

A. Tools: chipping hammer, wire brush, tip cleaners, 10 in. straight jaw locking pliers, welper pliers, combination square, silver pencil and soap stone.
B. Safety equipment: safety glasses, welders hat, leather gloves, leather jacket, leather chaps, leather shoes, and proper protective clothing (no tennis shoes, tank tops, or shorts).

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