BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

WLD 24 - Shielded Metal Arc Welding (Stick Electrode) **8 Unit(s)**

Prerequisite(s): WLD 21 and NCCER Level I Welding Qualification
Co-requisite(s): WLD 22, WLD 25, WLD 26, WLD 40, WLD 154
Recommended Prep: Reading Level III; English Level II; Math Level II
Transfer Status: CSU
34 hours Lecture
306 hours Lab

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).

II. **OBJECTIVES**

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

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

III. **COURSE CONTENT**

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

Lecture

Topics	Hours
1. Introduction and safety	2.00
2. Set up and operation of SMAW equipment	2.00
3. Basic joint and weld and base metal preparation	4.00
4. Five tools a welder controls, workmanship and worker habits	2.00
5. Reading welding detail drawings	2.00
6. Positions of welding plate	4.00
7. Introduction to welding symbols	2.00
8. Carbon steel electrodes and wires classification	4.00
9. Weld defects	3.00
10. Welder inspection and testing	2.00
11. Physical characteristics and mechanical properties of metals	2.00

12. Set up and operation of GMAW equipment	2.00
13. Set up and operation of FCAW equipment	1.50
14. Preheating and post heating of metals	1.50
Total Hours	34.00

Lab

Topics	Hours
1. Introduction and safety	5.00
2. Set up and operation of SMAW equipment	30.00
3. Basic joint and weld and base metal preparation	75.00
4. Five tools a welder controls, workmanship and worker habits	45.00
5. Reading welding detail drawings	14.00
6. Positions of welding plate	25.00
7. Introduction to welding symbols	25.00
8. Carbon steel electrodes and wires classification	10.00
9. Weld defects	20.00
10. Welder inspection and testing	11.00
11. Physical characteristics and mechanical properties of metals	10.00
12. Set up and operation of GMAW equipment	12.50
13. Set up and operation of FCAW equipment	12.50
14. Preheating and post heating of metals	11.00
Total Hours	306.00

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 Mid-term Project
F. Lab Final Project

VI. EXAMPLES OF ASSIGNMENTS

A. 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.
B. Writing Assignments

1. Describe an order of operations for SMAW setup of an SVOG welding joint.
2. Write an essay explaining how the assigned AWS article can be implemented into the process
   and how it relates to the class.

C. Out-of-Class Assignments

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

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

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

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

Materials Other Than Textbooks:

A. All tools listed in the Butte College Welding Technology Program Guide.

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