BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

WLD 34 - Pipe and Tube Welding **4 Unit(s)**

Prerequisite(s): WLD 22, WLD 24, WLD 25, WLD 26, WLD 40, WLD 50, WLD 154 and NCCER Level II Welding Qualification
Co-requisite(s): WLD 28, WLD 30, WLD 32, WLD 36, WLD 42, WLD 56, WLD 156
Recommended Prep: NONE
Transfer Status: CSU
17 hours Lecture
153 hours Lab

This course covers shielded metal arc welding (SMAW), gas tungsten arc welding (GTAW), gas metal arc welding (GMAW), and flux core arc welding (FCAW) processes on several pipe systems. A variety of materials and configurations on sub critical pipe welding (pressure and power systems, cross-country transmission, pipeline welding and water transmission pipe welding) will be used. Special attention and performance standards for the qualifications will be used from the following codes: American Petroleum Institute (API), American Welding Society (AWS) and American Society of Mechanical Engineers (ASME).

II. **OBJECTIVES**

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

A. Weld pipe and tube in 2G, 5G and 6G position using all the following processes: SMAW, GMAW, GTAW, and FCAW.
B. Apply qualifications procedures of the API, AWS, ASME codes for certification.
C. Follow procedures using the SMAW, GMAW, GTAW and FCAW welding processes meeting API, AWS, and ASME specifications for qualification of welding procedures and the welder.

III. **COURSE CONTENT**

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

Lecture

Topics	Hours
1. Introduction and safety	2.00
2. Applications of welded pipe, tube and joint preparation	0.50
3. Standards and tests for welded pipe and tube	0.50
4. Pipe and tube test positions	0.50
5. Welder and weld procedure qualifications	0.50
6. SMAW pipe welds	1.00
7. GMAW pipe welds	1.00
8. FCAW pipe welds	1.00
9. GTAW pipe welds – carbon pipe	1.00
10. SMAW pipe welds – stainless steel	1.00
11. GTAW pipe welds – low carbon and stainless steel pipe	1.00
12. Welding the root, hot pass, fill passes, and cover passes	1.00
13. Welding thin wall pipe	1.00
14. Welding in the 2G position	1.25

15. Welding in the 5G position	1.25
16. Welding in the 6G position	1.25
17. Pipe welding defects	1.25
Total Hours	17.00

Lab

Topics	Hours
1. Introduction and safety	1.00
2. Applications of welded pipe, tube and joint preparation	10.00
3. Standards and tests for welded pipe and tube	6.00
4. Pipe and tube test positions	10.00
5. Welder and weld procedure qualifications	6.00
6. SMAW pipe welds	10.00
7. GMAW pipe welds	10.00
8. FCAW Pipe welds	10.00
9. GTAW pipe welds - carbon pipe	10.00
10. SMAW pipe welds - stainless steel	10.00
11. GTAW pipe welds - low carbon and stainless steel pipe	10.00
12. Welding the root, hot pass, fill passes, and cover passes	12.00
13. Welding thin wall pipe	6.00
14. Welding in the 2G position	12.00
15. Welding in the 5G position	12.00
16. Welding in the 6G position	12.00
17. Pipe welding defects	6.00
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 Mid-term Project
F. Lab Final Project

VI. **EXAMPLES OF ASSIGNMENTS**

A. Reading Assignments

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

B. Writing Assignments
1. Write an essay explaining how the above AWS article can be implemented into the process and how it relates to the class.
2. Describe an order of operations for GTAW setup of a single vee open groove (SVOG) pipe welding joint.

C. Out-of-Class Assignments
1. Answer review questions for module 5.
2. Research the proper process for setting up SMAW equipment to weld on stainless steel pipe using manufactures publication.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**

Textbooks:

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

B. National Center for Construction Education and Research (NCCER). Welding Level Two. 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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