BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

WLD 55 - Power Generation and Petroleum Chemical Pipe & Tube Welding 5 Unit(s)

Prerequisite(s): WLD 22, WLD 24, WLD 25, WLD 26, WLD 28, WLD 30, WLD 32, WLD 34, WLD 36, WLD 40, WLD 42 and WLD 50, WLD 56 and NCCER Level III Welding Qualification
Co-requisite(s): WLD 158
Recommended Prep: Reading Level IV; English Level III; Math Level III

Transfer Status: CSU
17 hours Lecture
204 hours Lab

This course teaches shielded metal arc welding (SMAW), gas metal arc welding (GMAW), flux core arc welding (FCAW), gas tungsten arc welding (GTAW), oxyacetylene welding (OAW), and oxy-fuel cutting (OFC)processes on several piping systems. A variety of materials and configurations on sub-critical pipe welding to include pressure and power systems, cross-country transmission, water transmission and pipeline welding will be studied. Special attention and performance to the American Petroleum Institute (API) 1104 and American Society of Mechanical Engineers (ASME) Section IX code specifications for certification will be practiced. Intense training in pipe fitting, measurements, marking and layout tools used in the pipe welding industry will be stressed. Techniques of layout, cutting, fitting, and welding of various pipe joint designs will be performed.

II. **OBJECTIVES**

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

A. Correctly utilize the tools used in pipe layout and fitting.
B. Layout various pipe joint designs.
C. Cut, prepare, and weld various pipe joint designs.
D. Layout and cut eccentric and concentric reducers.
E. Apply qualification procedures of the API and ASME for certification.
F. Follow procedures using the OAW, SMAW, GMAW, FCAW, and GTAW welding processees meeting API 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	0.50
2. Definitions (terms used in the pipe trade)	0.50
3. Basic trade math	1.00
4. Measurements	1.00
5. Applications of welded pipe, tube and joint preparation	1.00
6. Tools used in industry	1.00
7. Standards and tests for welded pipe and tube	1.00
8. Pipe and tube test positions	1.00
9. Welder and weld procedure qualifications	1.00
10. API and ASME welding codes for qualifying tests	1.00
11. Pipe and fitting layouts	1.00

12.	Cutting and welding of large diameter pipe	1.00
13.	Welding the root, hot pass, fill passes, and cover passes	1.00
14.	Welding thin wall pipe	1.00
15.	Welding in the 2G position	1.00
16.	Welding in the 5G position	1.00
17.	Welding in the 6G and complicated 6GR position	1.00
18.	Pipe welding defects	1.00
Total Hours		17.00

Lab

Topics		Hours
1.	Introduction and safety	15.00
2.	Definitions (terms used in the pipe trade)	1.00
3.	Basic trade math	10.00
4.	Measurements	4.00
5.	Applications of welded pipe, tube and joint preparation	20.00
6.	Tools used in industry	4.00
7.	Standards and tests for welded pipe and tube	10.00
8.	Pipe and tube test positions	20.00
9.	Welder and weld procedure qualifications	10.00
10.	API and ASME welding codes for qualifying tests	10.00
11.	Pipe and fitting layouts	15.00
12.	Cutting and welding of large diameter pipe	20.00
13.	Welding the root, hot pass, fill passes, and cover passes	10.00
14.	Welding thin wall pipe	15.00
15.	Welding in the 2G position	5.00
16.	Welding in the 5G position	15.00
17.	Welding in the 6G and complicated 6GR position	10.00
18.	Pipe welding defects	10.00
Total Hours		204.00

IV. **METHODS OF INSTRUCTION**

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

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 1 and be prepared to discuss in class.

B. Writing Assignments
1. Write an essay explaining how the above United Association article can be implemented into the process and how it relates to the class.
2. Describe an order of operations for laying out a branch assembly.

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

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

A. National Center for Construction Education and Research (NCCER). Welding Level Three Advanced. 4th Edition. Pearson Education, 2010.
B. Frankland, T. The Pipe Fitter's and Pipe Welder's Handbook. GLENCOE - McGraw-Hill, 1984.
C. Frankland, T. Pipe Template Layout. GLENCOE - Macmillan/McGraw-Hill, 1967.
D. Turns, Tube Inc. Pipe Fitter's Manual. Tube Turns Inc., 1989.

Materials Other Than Textbooks:

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

Created/Revised by: Donald Robinson
Date: 04/18/2011