

BUTTE COLLEGE

COURSE OUTLINE

I. CATALOG DESCRIPTION

WLD 36 - Welder Qualification

3 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 34, WLD 42, WLD 56, WLD 156

Recommended Prep: NONE

Transfer Status: CSU

17 hours Lecture

102 hours Lab

This course prepares students for qualifications in several codes to meet the required standards for entry-level employment. Training in shielded metal arc welding (SMAW), gas tungsten arc welding (GTAW), gas metal arc welding (GMAW), and flux core arc welding (FCAW) to meet the American Welding Society (AWS), American Petroleum Institute (API), and American Society of Mechanical Engineers (ASME) code standards. Skills and proficiencies of all positions qualification test on plate and pipe are emphasized.

II. OBJECTIVES

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

- A. Apply qualification procedures in the previously developed training processes for groove and fillet welds.
- B. Apply qualification procedures in several codes to meet the required standard for entry-level employment.
- C. Complete welder qualification tests using various codes, filler materials, base materials, and welding processes.

III. COURSE CONTENT

A. Unit Titles/Suggested Time Schedule

Lecture	
<u>Topics</u>	<u>Hours</u>
1. Introduction and safety	2.00
2. Procedure and performance qualification	0.50
3. Base metal and its preparation	0.50
a. Flat	
b. Horizontal	
c. Vertical	
d. Overhead	
e. Design and preparation of a joint for production welding	
4. Limitations and variables of AWS welding code	1.00
a. SMAW	
b. GTAW	
c. FCAW	
e. GMAW	
5. Types of test and purpose	1.00
a. groove welds	
b. fillet welds	

6. Qualification of welders and welding operations	2.00
a. Performance qualification requirements	
b. The test specimen	
c. Testing of qualification weld	
d. Qualification records	
e. Standardization of tests	
f. Retests	
7. Groove plate tests welds	1.00
a. 1g (flat)	
b. 2g (horizontal)	
c. 3g (vertical)	
d. 4g (overhead)	
8. Fillet welds AWS specification	0.50
a. 1G (flat)	
b. 2G (horizontal)	
c. 3G (vertical)	
d. 4G (overhead)	
9. Test specimens: number, type and preparation	1.00
a. Complete joint penetration groove welds	
b. Non destructive testing	
c. Mechanical testing	
d. Partial Joint Penetration groove welds	
e. Fillet welds	
10. Method of testing specimens	1.00
a. Reduced--section tension specimens	
b. Macro-etch test	
c. Root, face, and side bend specimens	
d. All-weld metal tension test	
11. Welding of dissimilar materials	1.00
12. AR 1-2-3 level of welder qualification	1.50
a. Visual inspection	
b. Radiographic inspection (optional)	
c. Bend test	
d. Macrostructive examination	
e. Re test and re-qualification	
f. Fabricators records	
13. Welder qualification for ASME section IX	1.00
14. Welder qualification for API 1104	1.00
15. Qualification for other AWS welding codes (D1.5, D1.8, D10.4-66)	1.00
16. Review for Welder Qualification	1.00
Total Hours	17.00

Lab

<u>Topics</u>	<u>Hours</u>
1. Introduction and safety	2.00
2. Procedure and performance qualification	3.00
3. Base metal and its preparation	7.00
4. Limitations and variables of AWS welding code	2.00

5. Types of test and purpose	7.00
6. Qualification of welders and welding operations	8.00
7. Groove plate test welds	12.00
8. Fillet welds AWS specification	3.00
9. Test specimens – number, type, and preparation	7.00
10. Methods of testing specimens	6.00
11. Welding of dissimilar materials	6.00
12. AR 1-2-3 level of welder qualification	8.00
13. Welder qualification for ASME section IX	12.00
14. Welder qualification for API 1104	6.00
15. Qualification for other AWS welding codes (D1.5, D1.8, D10.4-66)	6.00
16. Review for Welder Qualification	7.00
Total Hours	102.00

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 6 and be prepared to discuss in class.
 - 2. Read assigned AWS journal article and be prepared to discuss 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 the welding of two dissimilar materials.
- C. Out-of-Class Assignments
 - 1. Compare and contrast the welder qualification standards for the two welding codes assigned.
 - 2. Answer review questions for module 2.

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

- A. AWS Committee on Methods of Inspection. Welding Inspection. 3rd Edition. American

Welding Society, 2000.

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

Created/Revised by: Donald Robinson

Date: 04/18/2011