

Lassen Community College Course Outline

WT 22 Power Plant & Field Pipe Welding III

3.0 Units

I. Catalog Description

This is a fundamental class dealing with pipe welding in the 6G position using the shielded metal arc welding (SMAW) process. Joint designs will be performed using the gas metal arc welding (GMAW), and the gas tungsten arc welding (GTAW) process in preparation for welding root passes on pipe. Welding symbols are presented and reviewed in order to enable students to interpret welding blueprints. This is the third of a four course sequence to prepare students for power plant and field pipe welding. American Welding Society (AWS) qualifications in GTAW, GMAW, and flux core arc welding (FCAW) will be prepared and completed. Repeatable as required for qualification by the AWS D1.1 Section 4 Period of Effectiveness. (Instructor Authorization Required for Course Repetition.) This course has been approved for hybrid delivery.

Recommended Preparation: Successful completion of ENGL105 or equivalent multiple measures placement.

Transfers to CSU only

17 Hours Lecture, 102 Hours Lab, 34 Hours Out of Class, 153 Total Student Learning Hours
Scheduled: Spring and Fall

II. Coding Information

Repeatability: Unlimited Per AWS Qualification Requirements

Grading Option: Graded or Pass/No Pass

Credit Type: Credit - Degree Applicable

TOP Code: 095650

III. Course Objectives

A. Course Student Learning Outcomes

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

1. Complete (16) open root groove welds (four each in the 1G, 2G, 3G and 4G positions) using the GTAW process
2. Complete six (6) 6G pipe joints, using the SMAW equipment on 6" schedule 80 pipe, which meets or exceeds the AWS D1.1 Structural Welding Code standards.
3. Apply the GMAW and FCAW processes to joint designs, which meets or exceeds the AWS D1.1 Structural Welding Code standards.
4. Complete GTAW, GMAW, and FCAW qualifications, which meets or exceeds the AWS D1.1 Structural Welding Code standards.

B. Course Objectives

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

1. Demonstrate safe preparation and setup of pipe joints in the 6G position.
2. Demonstrate the manipulative skills needed to make successful pipe welds in the 6G position.
3. Demonstrate the manipulative skills necessary to perform GTAW on specified and recognized joint designs, which comply with industry standards

4. Evaluate and apply welding symbols to blueprints.
5. Demonstrate manipulative skills needed to use GMAW and FCAW on specified weld joint designs which comply with industry standards.
6. Demonstrate the manipulative skills needed to set up and complete AWS qualifications in GTAW, GMAW and FCAW.

IV. Course Content

- A. Safety Precautions**
 1. Electrical shock
 2. Radiation hazards
 3. Compressed gases
 4. Air contamination
- B. Pipe Joint Preparations - 6G**
 1. Beveling
 2. Landings
 3. Fit-up
- C. Inclined Angle Position (6G)**
 1. Tack welds
 2. Electrode angles
 3. Electrode motion
 4. Root pass
 5. Fill pass
 6. Cover pass
- D. Gas Tungsten Arc Welding**
 1. Machine settings
 2. 1G open root (Flat)
 3. 2G open root (Horizontal)
 4. 3G open root (Vertical)
 5. 4G open root (Overhead)
- E. Gas Metal Arc Welding**
 1. Machine settings
 2. Flat stringers
 3. Overlaps
 4. T-Joint horizontal (2F)
 5. T-Joint 3F and 4F
- F. Flux core arc welding**
 1. Machine settings
 2. Flat stringers
 3. Overlaps
 4. T-Joint 2F, 3F, 4F
- G. AWS Qualifications**
 1. GTAW
 - a. 3F
 - b. 4F
 2. GMAW
 - a. 3F
 - b. 4F
 3. FCAW
 - a. 3G

- b. 4G
- 4. SMAW
 - a. 3G Plate
 - b. 4G Plate
 - c. 6G Pipe

V. Assignments

A. Appropriate Readings

Standard college level text, "Welding Principles & Applications" and/or trade manuals will be primary sources of course readings. Additional information sources will include product and use guides from industry manufacturers to enhance the learning process.

B. Writing Assignments

Students will apply technical skills and understanding of course content by demonstrating application of specific welding processes to recognized joint designs which meet industry standards. Mixed format exams will also be administered throughout the course.

C. Expected Outside Assignments

May include:

1. Reading and answering questions at the end of chapters as assigned by the instructor.
2. Pertinent supplementary literature
3. Field trips to construction sites
4. Take-home essays

D. Specific Assignments that Demonstrate Critical Thinking

Students will be required to demonstrate understanding of welding concepts and practices by applying technical information to multiple manipulative performance objectives which meet critical industry specifications.

VI. Methods of Evaluation

Traditional Classroom Evaluation

Methods for determining students grades will be accomplished by the following:

1. Performance on mixed format exams
2. Completion of required manipulative performance objectives
3. Participation in classroom learning activities

Hybrid Evaluation

Students will be expected to complete all quizzes, exams, online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation active communication between instructor and students.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery Correspondence Delivery

Hybrid Delivery Online Delivery

Traditional Classroom Delivery
Lecture/Demonstration/Laboratory

Hybrid Delivery

A combination of traditional classroom and online instruction will be utilized. Each semester a minimum of 102 hours will be taught face-to face by the instructor and the remaining hours will be instructed online through the technology platform adopted by the District. Traditional class instruction will consist of exercises/assignments, lectures, visual aids, and practice exercises. Online delivery will consist of exercises/assignments, lecture posts, discussions, adding extra resources and other media sources as appropriate.

VIII. Representative Texts and Supplies

Jeffus, Larry; "*Welding Principles & Applications*", 2017, 8th Edition, Delmar Cengage Learning, ISBN: 978-1-305-494695-5

Supplies: (Required)

Gauntlet leather welding gloves
Safety glasses
Leather "logging type" boots
Cuffless heavy cotton workpants, in good repair

IX. Discipline/s Assignment

Welding Technology

X. Course Status

Current Status: Active
Original Approval Date: 2/27/1990
Revised By: Kory Konkol
Latest Curriculum/Academic Standards Committee Revision Date: 02/15/2022