

# Lassen Community College Course Outline

## WT-21 Power Plant & Field Pipe Welding II

3.0 Units

### I. Catalog Description

This is the second course of a four course sequence dealing with pipe welding, in the 2G and 5G positions, using the shielded metal arc welding (SMAW) process. Gas tungsten arc welding (GTAW) will be introduced to prepare the student for welding on pipe using the GTAW process. American Welding Society (AWS) welding qualification will be prepared and completed on one inch plate in the 3G and 4G positions. 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 Outside 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. Apply ER70S fill rod to six joint designs, using the gas tungsten arc welding process on 16g hot rolled steel.
2. Complete four (4) 2G and four (4) 5G pipe joints using SMAW equipment on 6" schedule 80 pipe, which meets or exceeds the AWS D1.1 Structural Welding Code standards.
3. Complete a 1"-3G and a 1"-4G AWS qualifications using the SMAW process.
4. Complete a 2G and 5G AWS pipe welding qualification on 6" schedule 80 pipe using the SMAW process.

#### 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 2G and 5G positions.
2. Demonstrate the manipulative skills needed to make pipe welds in the 2G and 5G positions using the SMAW process.
3. Demonstrate GTAW manipulative skills.
4. Demonstrate the manipulative skills needed to set up and complete AWS qualifications in the 3G and 4G positions.

### IV. Course Content

#### A. Safety Precautions

1. Personal protection
  2. Air contamination
  3. Electrical shock
  4. Radiation hazards
- B. Pipe Joint Preparations**
1. Beveling
  2. Landings
  3. Fitup
  4. Pipe joint positions - 2G and 5G
- C. Vertical Fixed Position (2G) and Horizontal Fixed Position (5G)**
1. Tack welds
  2. Electrode angles
  3. Electrode motions
  4. Root pass
  5. Fill passes
  6. Cover passes
- D. Gas Tungsten Arc Welding**
1. Machine settings
  2. Electrode selection
  3. Electrode angles
  4. Selected ferrous joint designs
- E. AWS Qualifications**
1. 3G plate - 1"
  2. 4G plate - 1"
  3. 2G pipe
  5. 5G pipe

## **V. Assignments**

### **A. Appropriate Readings**

Standard college level text, "Welding Principles & Applications," and/or trade manuals. 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 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 and to maintain effective 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, 8<sup>th</sup> 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