

**Western Iowa Tech Community College
Course Outline of Record**

Date: 02/06/2015

Prefix & No.: WEL 164 Course Title: Arc Welding II (SMAW)

Semester **Credit** Hours: 4.00

Lecture **Contact** Hours per Semester: 16.00

Lab **Contact** Hours per Semester: 96.00

Clinical **Contact** Hours per Semester: 0.00

OJT or Internship **Contact** Hours per Semester:

Course/Lab Fee: Yes No

Pre and Post Assessments: __

Course Description

This course combines lecture and lab activities to present welding codes, distortion, and welding inspection. Students are exposed to welding with a variety of welding electrodes, providing lab experiences in full penetration, horizontal, vertical, and overhead position welds.

Prerequisite: WEL 148 ARC Welding Intermediate (SMAW)

Corequisite: None

Course Needs Statement

Welding production, construction, and maintenance all require out of position welding. This requires a high level of skill. Standards are used to determine weld quality.

Required Textbooks and/or materials

Yes No Other

Course Objectives:

The course will provide information which should enable the student to:

1. Follow safety procedures for welders
2. Visually inspect welds and practice weld tests to AWS specifications
3. Make multiple pass welds in all positions
4. Explain how to make open and closed root welds
5. Demonstrate how to use a hot pass to clean a weld
6. Identify the types and parts of weld grooves
7. Explain how to prepare, test and evaluate, guided bend specimens
8. Meet AWS requirements for vertical, horizontal, and overhead welds
9. Explain welding procedures and welder qualification (AWS)
10. Explain both destructive and non-destructive testing methods and their uses
11. Identify metals prior to welding
12. Be able to use the air ARC cutting and gouging process
13. Describe the welding procedures for welding cast iron and hard surfacing

Content Outline

- I. Guided Bend Testing
 - A. Coupon cutting
 - B. Surface preparation
 - C. Face bends
 - D. Root bends
 - E. Evaluation
- II. Welding Procedures
 - A. Parameters
 - B. Processes
 - C. Prequalified weld joints
 1. Full penetration
 2. Partial penetration

- III. Welder Qualifications (AWS)
 - A. Qualification tests
 - B. Plate
 - C. Pipe
- IV. Metal Identification
 - A. Types of metals
 - B. Tests
- V. Air ARC Cutting
 - A. Torches
 - B. Electrodes
 - C. Settings
- VI. Welding Cast Irons
 - A. Methods
 - B. Electrodes
 - C. Pre & Post Treatment
- VII. Hard Surfacing
 - A. Processes
 - B. Electrodes
 - C. Application

Assessment

Course Competencies

At the conclusion of the course, the student will be able to:

1. Utilize all shop safety procedures
2. Describe weld defects
3. Determine proper welding electrodes current and amperage
4. Determine joint design and weld size
5. Explain open and closed root welds
6. Use a hot pass to clean a weld
7. Identify groove weld parts
8. Explain how guided bend tests are made
9. Interpret weld quality per the AWS welding code D1.1 Structural Welding
10. Develop a weld procedure specification
11. Explain the welding operator and welder certification process
12. Describe how to test metals to determine the chemical make up of metals
13. Explain the uses of carbon ARC cutting
14. Describe the process of welding cast iron
15. Give the uses of hard surfacing
16. Apply proper welds to a structure
17. Produce single and multiple pass welds out of position that meet AWS standards
18. Complete the following competencies by AWS standards on a pass-fail basis:
 - a. Tee joint 3/16" filler (vert. up) E6010
 - b. Lap joint 3/16" plate (vert. up) E6010
 - c. Tee 3 bead 3/8" fillet (vert. up) E6010
 - d. V butt horizontal 3/8" plate E6010
 - e. V groove open root vertical up E6010 root pass E7018 Hot & Fill pass
 - f. V groove open root horizontal E6010 root pass E7018 Hot & Fill pass
 - g. V groove open root overhead E6010 root pass E7018 Hot & Fill pass
 - h. V groove open root 45 degree (6G)E6010 root pass E7018 Hot & Fill pass
19. WEL 1232 Task List
 - a. Pad E6013 flat
 - b. Pad E7018 flat
 - c. Tee E7018 3/16" fillet horizontal
 - d. Pad E6010 flat" fillet (vert.)
 - e. Tee E6010 3/16" fillet horizontal
 - f. 3-bead tee 3/8" fillet E7018 horizontal
 - g. Sq. butt weld E6010 flat)
 - h. 3-bead tee 3/8" fillet E6010 horizontal
 - i. Lap joint E6010 E6013 E7018 horizontal (3/16" plate)

- j. V-groove 3/8" plate E7018
- k. Tee 3 bead 3/8" fillet E7018 vertical up
- l. Tee joint 3/16" fillet E6010 vertical down
- m. Tee joint 3/16" fillet E6010 vertical up
- n. Lap joint 3/16" plate vertical down

Addendum

Prefix & No.: WEL 164 **Course Title:** Arc Welding II (SMAW)

Key words:

Required Textbooks and/or Materials

Title: Welding Principles and Applications

Author: Jeffus & Johnson

Edition: Current

Publisher: Delmar Publications

ISBN-13:

ISBN-10:

Other Materials: Safety Glasses, Welding Leathers, Wire Brush, Chipping Hammer, Gloves and Pliers

Course/Lab Fee: \$110.00

Rationale (usage) for lab fees: welding materials

Additional Information:

Common Final: Yes No

See Division Chair for facility and equipment needs.

Reminder: Each Course Outline of Record is expected to be reviewed every five (5) years.

Attached Files: