

CATALOG INFORMATION

Dept and Nbr: WELD 170      Title: BEGINNING WELDING  
Full Title: Beginning Welding: Fundamentals of Arc and Gas Welding  
Last Reviewed: 11/13/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	2.00	Lecture Scheduled	1.00	17.5	Lecture Scheduled	17.50
Minimum	2.00	Lab Scheduled	3.00	4	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 35.00

Total Student Learning Hours: 105.00

Title 5 Category: AA Degree Applicable  
Grading: Grade or P/NP  
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly: WELD 70

**Catalog Description:**  
The student will learn the fundamentals of arc and oxy-acetylene welding, and oxy-acetylene flame cutting. Topics will include safety, shop practices, and preparation for American Welding Society (AWS) welding certifications.

**Prerequisites/Corequisites:**

**Recommended Preparation:**  
Eligibility for ENGL 1A or equivalent

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: The student will learn the fundamentals of arc and oxy-acetylene welding, and oxy-acetylene flame cutting. Topics will include safety, shop practices, and preparation for American Welding Society (AWS) welding certifications. (Grade or P/NP)  
Prerequisites/Corequisites:  
Recommended: Eligibility for ENGL 1A or equivalent  
Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>		Effective:	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Demonstrate use of tools and equipment in a welding shop per American National Standards Institute (ANSI) safety standards Z49.
2. Perform arc weld from the flat, fillet weld position per AWS standards.
3. Perform oxy-acetylene weld on a butt joint, lap joint, fillet joint, and brazing fillet joint per AWS standards.
4. Demonstrate ability to safely use oxy-acetylene cutting torch per AWS standards.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Describe and demonstrate principles of welding safety per ANSI and AWS standards.
2. Identify components of oxy-acetylene welding and cutting equipment.
3. Recognize a transformer, rectifier, and motor generator type welding machine.
4. Explain electrical terms, including AC and DC welding current.
5. Identify components of shielded metal arc welding equipment.
6. Safely set up and place in operation oxy-acetylene and shielded metal arc welding equipment.
7. Differentiate between plain carbon steel, alloy steel, ferrous metals, and non-ferrous metals.
8. Produce a sample butt joint, lap joint, fillet weld, and braze welded fillet using the oxy-acetylene welding process.
9. Produce a sample of free hand flame cutting and straight line beveling and piercing.
10. Produce a sample of stringer beads, padding, in the flat position, a multipass fillet weld in the horizontal position, a lap joint and a fillet weld in the vertical down position using shielded metal arc welding.
11. Identify filler metals for oxy-acetylene and arc welding.
12. Recognize uses and purposes of a light, medium and heavy flux coated arc welding electrode, such as E-6010, E-6011, E-6013, E-7014, E-7018, and E-7024.

### **Topics and Scope:**

## I. Shielded Metal Arc Equipment

- A. Arc welding safety per ANSI standard Z49.1
- B. Electrical terms
- C. Welding machines
- D. Personal equipment
- E. Shop equipment
- F. Basic welding terms

## II. Oxy-Acetylene Equipment

- A. Oxy-acetylene safety per ANSI standard Z49.1
- B. Oxy-acetylene chemistry
- C. Compressed gas cylinders
- D. Pressure regulators
- E. Hose, torches, and tips
- F. Review of safety features and procedures in handling equipment

## III. Metallurgy

- A. Steel production
- B. Ferrous and non-ferrous metals
- C. Alloy steels
- D. Effects of heat during welding
- E. Metals identification

## IV. Striking an Arc

- A. Arc welding electrode selection
- B. Adjusting equipment
- C. Running short beads
- D. Running continuous beads
- E. Fillet welds
- F. Vertical down beads
- G. Joint design
- H. Manipulative practice
- I. Safety procedures related to striking an arc

## V. Oxy-Acetylene Welding

- A. Tip selection and flame settings
- B. Torch position and motion
- C. Selecting a filler rod
- D. Laying beads with a filler rod
- E. Joint design
- F. Butt joint, lap joint, and fillet welds
- G. Manipulative practice
- H. Welding safely

## VI. Flame Cutting

- A. Cutting safety per ANSI standard Z49.1
- B. Cutting torches
- C. Gas pressure settings
- D. Flame settings
- E. Torch manipulation
- F. Manipulative practice
- G. Safety issues related to flame cutting

## VII. Brazing

- A. Joint preparation
- B. Filler rod selection
- C. Flame settings
- D. Fluxes

- E. Temperature control
- F. Manipulative practice
- G. Safety issues related to brazing

All topics are covered in both the lecture and lab parts of the course.

### Assignment:

#### Lecture-Related Assignments:

1. Weekly reading (5-25 pages)
2. Reading quizzes based on handouts developed by AWS, SRJC Welding program, and from manufacturers (7-14)
3. Class notes in student notebook/ binder
4. Closed-book safety tests which includes AWS and department safety issues and procedures. 100% score required to pass

#### Lab-Related Assignments:

1. Practical skills assignments and welding samples

#### Lecture- and Lab-Related Assignments:

1. Midterm and final exam (includes written and practical portions) based on AWS licensing requirements and SRJC Welding program questions. Passing score per department grading policy.

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Class notes in student notebook/ binder
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Writing 0 - 10%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

None
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Problem solving 0 - 0%
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**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Practical skills assignments and welding samples
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Skill Demonstrations 40 - 50%
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**Exams:** All forms of formal testing, other than skill performance exams.

Reading quizzes; safety tests; midterm and final exam
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Exams 40 - 50%
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**Other:** Includes any assessment tools that do not logically fit into the above categories.

Participation
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Other Category 0 - 10%
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**Representative Textbooks and Materials:**

Modern Welding. 12th ed. Bowditch, William and Bowditch, Kevin and Bowditch, Mark.

Goodheart Wilcox. 2020.

Instructor prepared materials