Course Information

Division: Industrial Technology Education
Course Number: WLD 101
Title: Welding
Credits: 2-3
Developed by: Carlton Penn
Lecture/Lab Ratio: 2 Credits = 1 Lecture/3 Lab
3 Credits = 1 Lecture/4 Lab
Transfer Status

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Activity Course: No
CIP Code: 48.0508
Assessment Mode: Pre/Post Test (50 Questions/100 Points)
Semester Taught: Fall and Spring
GE Category: None
Separate Lab: No
Awareness Course: No
Intensive Writing Course: No
Diversity and Inclusion Course: No

Prerequisites
None

Educational Value
For students pursuing the Welding Technology Certificate, Welding AAS Degree, or current workers upgrading skills. Supports automotive and drafting curricula and community interest students who would like to improve their skills and learn more about welding procedures.

Description
This course teaches principles of arc and oxyacetylene welding, flame cutting, and brazing with emphasis on mastering basic welding techniques.

Supplies
There is a $25.00 materials fee for this course.
**Competencies and Performance Standards**

1. **Identify safety as it applies to the welding industry.**

   **Learning objectives**
   What you will learn as you master the competency:
   a. List all of the safety rules which apply to the welding shop.
   b. Identify situations which produce specific hazards in the welding environment.
   c. Identify the causes of accidents in case studies.
   d. Develop the habits of working safely in all situations.
   e. Examine the effects that welding processes may have on the environment.

   **Performance Standards**
   You will demonstrate your competence:
   o in using welding and cutting equipment in the EAC welding shop
   Your performance will be successful when:
   o learner works safely and uses appropriate safety gear with each piece of welding equipment
   o learner sets up all of the welding equipment correctly for the required conditions
   o learner operates all of the welding equipment safely
   o learner uses all appropriate safety procedures while using welding and cutting equipment
   o learner identifies effects the welding process has on the environment

2. **Identify specific welding joint designs.**

   **Learning objectives**
   What you will learn as you master the competency:
   a. Identify when to use the butt joint.
   b. Identify when to use the lap joint.
   c. Identify when to use the T-joint.
   d. Identify when to use the edge joint.
   e. Identify when to use the corner joint.

   **Performance Standards**
   You will demonstrate your competence:
   o in projects being designed using the equipment in the EAC welding shop
   Your performance will be successful when:
   o learner shows how to use the butt joint
   o learner shows how to use the lap joint
   o learner shows how to use the T-joint
   o learner shows how to use the edge joint
   o learner shows how to use the corner joint
3. Recognize and create accurate welds in each welding position.

**Learning objectives**
What you will learn as you master the competency:

a. List the welding positions.
b. Identify the situations in which to use each welding position.
c. Correctly weld in each of the welding positions.

**Performance Standards**
You will demonstrate your competence:

- in using welding equipment in the EAC welding shop

Your performance will be successful when:

- learner accurately lists the welding positions
- learner correctly identifies which weld to use
- learner successfully uses each welding position

4. Use measuring and layout tools to mark metal for various cuts.

**Learning objectives**
What you will learn as you master the competency:

a. Describe and name marking and layout tools used in the welding industry.
b. Decipher the type and location of cuts needed on various metals.
c. Measure material correctly using layout tools.

**Performance Standards**
You will demonstrate your competence:

- in using layout tools in the welding shop

Your performance will be successful when:

- learner identifies which layout tools to use
- learner accurately uses layout tools

5. Produce accurate cuts on various metals using a variation of machines and cutting processes.

**Learning objectives**
What you will learn as you master the competency:

a. Produce accurate cuts on the horizontal band saw safely.
b. Produce accurate cuts on the iron worker safely.
c. Produce accurate cuts on the abrasive metal cutoff saw safely.
d. Set up and shut down the oxyacetylene (OFC) equipment for cutting.
e. Produce accurate cuts using the OFC cutting equipment safely.

**Performance Standards**
You will demonstrate your competence:

- in using the equipment and supplies in the EAC welding shop

Your performance will be successful when:

- learner correctly uses the band saw to make cuts
6. Produce sound welds using the oxyacetylene welding (OAW) equipment.

**Learning objectives**

*What you will learn as you master the competency:*

a. Set up and shut down oxyacetylene welding (OAW) equipment safely.

b. Produce sound welds in various positions according to welding industry standards using oxyacetylene welding (OAW) equipment.

c. Explain the braze welding process and safely produce sound braze welds according to industry standards using the oxyacetylene welding (OAW) equipment.

**Performance Standards**

*You will demonstrate your competence:*

- in using the welding equipment in the welding shop

*Your performance will be successful when:*

- learner sets up oxyacetylene equipment safely and correctly

- learner performs satisfactory welds on butt, T and corner joints in the flat position and braze welds

- learner shuts down oxy-acetylene equipment safely and correctly

7. Select proper shielded metal arc welding (SMAW) electrodes.

**Learning objectives**

*What you will learn as you master the competency:*

a. Identify and explain the American Welding Society (AWS) numeric system for identification of shielded metal arc welding (SMAW) electrodes.

b. Identify and list electrodes that are in the following categories: fill freeze electrodes, fast freeze electrodes, fast fill electrodes, and low hydrogen fill freeze electrodes.

c. Select the proper electrode for assigned welding project.

**Performance Standards**

*You will demonstrate your competence:*

- in using the arc welding machines in the machine shop

*Your performance will be successful when:*

- learner will select the correct size and type of electrode for fill freeze welding assignments

8. Produce sound welds using the shielded metal arc welding process (SMAW).

**Learning objectives**

*What you will learn as you master the competency:*

a. Identify and safely set up and use an electric arc welding machine for welding mild steel with the shielded metal arc welding (SMAW) process.

b. Produce sound welds on basic joint configurations and in various positions using low
hydrogen fill freeze electrode, according to industry standards using SMAW machines.

c. Produce a sound weld using the SMAW process and pass a tensile stress test according to industry standards.

**Performance Standards**

You will demonstrate your competence:

- in using the welding and cutting equipment in the welding shop

Your performance will be successful when:

- learner will set up and inspect SMAW equipment correctly
- learner will perform beads using a fill freeze electrode (7018) in the flat, horizontal, vertical and overhead position
- learner will successfully pass a tensile stress test using a fill freeze electrode (7018) on mild steel using a single V groove with backing strip joint design

**Types of Instruction**

Lecture
Shop work in the welding lab

**Grading Information**

**Grading Rationale**

60% Practical assignments performed in the shop
30% Written assignments, tests and quizzes
10% Final Exam

**Grading Scale**

A  90% - 100%
B  80% - 89%
C  70% - 79%
D  60% - 69%
F  Below 60 %