Course Information

Division: Industrial Technology Education
Course Number: WLD 108
Title: Welding and Metal Fabrication
Credits: 3
Developed by: Brian Coppola
Lecture/Lab Ratio: 1 Lecture/4 Lab
Transfer Status:

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<th>ASU</th>
<th>NAU</th>
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<td>Non Transferable</td>
<td>CTE Departmental Elective</td>
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Activity Course: No
CIP Code: 48.0508
Assessment Mode: Pre/Post Test (25 Questions/100 Points)
Semester Taught: Fall
GE Category: None
Separate Lab: No
Awareness Course: No
Intensive Writing Course: No

Prerequisites
None

Educational Value

A. To General Education
To reinforce and use basic academic skills learned in general education
B. To Technical Education
To develop analytical and hand skills necessary to pursue a technical career interest
C. Other
To act as a building block for other courses of study in the metal working field.

Description
This basic welding and metal fabrication course will stress theory and application of fundamental welding and soldering methods. These methods include torch welding along with brazing, soldering, heating, and cutting. Student will be exposed to stick Arc and MIG (metal inert gas) welding. Instruction is also given on sheet metal layout and construction of a small project. This course also provides an introduction to using a numerical controlled plasma cutter to fabricate a project uploaded from a CAM (computer aided machining) program. An additional nonrefundable welding course fee is required.
**Supplies**

Safety Glasses

**Competencies and Performance Standards**

1. **Discuss job opportunities available in the metal fabricating field.**

   **Learning objectives**
   
   What you will learn as you master the competency:
   
   a. Understand different industry expectations in the metal fabricating field.
   b. Recognize semiskilled and skilled employment.
   c. Understand what technical employment is.
   d. Understand professional employment and the job opportunities available.

   **Performance Standards**
   
   Competence will be demonstrated:
   
   - in written assignments

   Criteria - Performance will be satisfactory when:
   
   - learner demonstrates knowledge of job opportunities available

2. **Demonstrate the ability to inspect, set-up, and safely operate oxyacetylene welding equipment.**

   **Learning objectives**
   
   What you will learn as you master the competency:
   
   a. List general safety terms and requirements.
   b. Describe concepts related to work area safety.
   c. Demonstrate using protective equipment.
   d. Identify procedures that must be followed for fire and accident prevention.

   **Performance Standards**
   
   Competence will be demonstrated:
   
   - in safety tests

   Criteria - Performance will be satisfactory when:
   
   - learner demonstrates ability to follow shop safety rules and use shop equipment, in a safe manner, according to operation manual

3. **Demonstrate an ability to apply metal fabrication knowledge that includes basic shop math and design interpretation to fabricate sheet metal project.**

   **Learning objectives**
   
   What you will learn as you master the competency:
   
   a. Demonstrate an ability to evaluate and interpret shop drawings in order to perform accurate sheet metal layout process.
   b. Demonstrate an ability to use tape measures, squares, straight edge and gages to layout sheet design onto a sheet of metal.
   c. Demonstrate an ability to use shearing, notching, bending, forming, and spot welding or metal joining techniques to fabricate sheet metal project.
Performance Standards
Competence will be demonstrated:
 o in lab assignments and activities
Criteria - Performance will be satisfactory when:
 o learner can produce a dimensionally accurate project
 o learner uses all tools, equipment, and shop reference materials responsibly
 o learner produces a properly cut, bended, formed, and joined spot welding sheet metal project

4. Demonstrate the ability to use oxyacetylene cutting and welding, stick Arc, and MIG welding techniques to correctly join different metals.

Learning objectives
What you will learn as you master the competency:
 a. Perform brazing process correctly.
 b. Perform soldering & pipe sweating techniques properly.
 c. Demonstrate an ability to join metal using Arc welding techniques (stick).
 d. Demonstrate an ability to weld thin pipe in an overhead position using MIG process.
 e. Demonstrate the ability to spot-weld.
 f. Demonstrate an ability to set-up torch and cut ¼ steel plate properly.

Performance Standards
Competence will be demonstrated:
 o in lab activities
Criteria - Performance will be satisfactory when:
 o learner can demonstrate their competence in fusing metal coupons together properly using welding techniques shown above

5. Demonstrate the ability to use CAM software program and plasma CAM cutting equipment to fabricate projects from dimensional drawings.

Learning objectives
What you will learn as you master the competency:
 a. Describe plasma.
 b. Describe how plasma cutting torch works.
 c. Describe the advantages and disadvantages of using a plasma cutting torch.
 d. Demonstrate an ability to up-load CAM program and use a plasma CAM cutting equipment to produce sheet metal design and or project.

Performance Standards
Competence will be demonstrated:
 o in lab activities
 o in assigned projects
Criteria - Performance will be satisfactory when:
 o learner can demonstrate the correct procedures for preparing plasma CAM to cut project(s)
learner can demonstrate the correct procedures for setting up and adjusting the settings on a plasma arc cutting machine on required projects

**Types of Instruction**
Lecture/discussion/demonstration/collaboration
Application of knowledge & practice

**Grading Information**

**Grading Rationale**
Class - 40%
1. All tests equal in weight.
2. Report and unit questions will equal one test in weight.
3. Post test will be at least 10% of the final grade.

Laboratory - 60%
1. Welding project will equal 1/3 of lab grade.
2. Sheet metal project will equal 1/3 of lab grade.
3. Lab productivity Time Card will equal 1/3 of lab grade.

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