Welding 4 Course Syllabus

Mitchell Career and Technical Education Academy

Assignment Code 13208

Mr. Zard

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COURSE DESCRIPTION

**Welding 4**

½ Credit Elective Grade Level: 10 11 12

Pre-requisite: Welding 1, 2&3

This course is designed to enhance the student’s ability as a welder. Students will weld test plates, build projects, and learn to weld in out-of-position places. They will also learn about the industry through guest speakers and take part in career building activities. Students will learn in a hands-on environment with an emphasis on safety. Safety training must be completed before students are allowed to enter the lab.

MATERIALS/TEXTBOOK INFORMATION

**Reference Books**

Welding, Easy-to-Read guide to welding. By David J. Hoffman, Kevin R. Dahle, and David J. Fisher. Pearson Education, Inc., 2012

Welding, Student Lab Manual. By David J. Hoffman, Kevin R. Dahle, and David J. Fisher. Pearson Education, Inc., 2012

How to Read Shop Drawings, With Special Reference to Arc Welding. By The James F. Lincoln Arc Welding Foundation., 2008

Safety in Welding Cutting, and Allied Processes. ANSI Z49, 1., 2012

Guidelines for Shielded Metal Arc Welding (SMAW), Miller., 2010.

Guidelines for Gas Metal Arc Welding (GMAW), Miller.,2010.

Guidelines for Gas Tungsten Arc Welding (GTAW), Miller., 2010.

**Required Supplies**

* Pencils/Pens
* Notebook
* Folders for Handouts

LEARNING OBJECTIVES

* Work in shop area in a safe manner 100% of the time.
* Identify a good bead according to width, penetration, smoothness, and placement.
* Safely start up and shut down an Oxy/Fuel station safely and efficiently.
* Know the safety precautions necessary to operate an Oxy/Fuel station.
* Operate a plasma cutter safely and accurately.
* Explain the difference between AC and DC current.
* Demonstrate the process of SMAW welding and the safety precautions that must be taken during the welding operation.
* Understand the process of GMAW welding and the safety precautions that must be taken during the welding operation.
* Identify different cylinders that are located in the welding shop environment and understand what each type of gas is used for.
* Operate each different type of saw accurately and safely.
* Understand the safety involved in using stationary and hand grinders.
* Understand basic blueprint reading.
* Identify different welding symbols.
* Understand the process of project construction starting with basic sketches, to blueprints, to the finished product.
* Demonstrate the ability to use the benders and specialty tools in the shop in a safe manner.
* Understand the process of TIG welding and the safety precautions that must be taken during the welding operation.

ASSSESSMENT PLAN

**Student Evaluation Process**

Projects/Lab Points

Weld Joints

Questions/Quizzes

Bend Tests

Cut and Etch Tests

**Letter grades are determined by the MCTEA grading scale outlined below**

90-100% A

80-89% B

70-79% C

60-69% D

59% or Below F

MAKE UP WORK

**Testing Policy**: No talking. No Cheating. Tests will be collected and given no credit if either offense is violated.

**Makeup Work:** Missing assignments should be turned in within one week of missing a scheduled assignment. A time must be scheduled with me immediately upon returning to class, to make up a missed test. Students will need to schedule lab time with the instructor outside of class.

GENERAL INFORMATION

**Classroom Rules:**

1. No horseplay (Pushing, hitting, etc)
2. No throwing things
3. No talking while myself or another student is talking during lectures
4. Be polite, courteous, and respectful to everyone in the classroom and their belongings
5. No cell phones
6. No foul language
7. Only water is allowed in the classroom or lab (no food, candy or pop)

**General Safety Policies:**

1. All students must wear clothing suitable to the activity (shop coats, aprons, or old clothes) Absolutely NO shorts, sandals, or short sleeves in the welding areas. You will not be allowed to weld without proper attire.
2. Students must remove or securely fasten jewelry, loose clothing, long hair, etc.
3. Students must wear approved safety eye protection **at all times** while in the lab, except in safe areas as designated by the instructor. Students who wear glasses must have attached side protectors or safety glasses over the top of their original eye glasses. No exceptions.
4. Students must have permission at all times from the instructor to work in the laboratory.
5. A running machine must never be left unattended.
6. Accident reports must be filled out on all injuries and on near injuries as well.
7. All material and equipment damage must be reported.
8. No student may use any machine on which he/she has not been properly instructed.
9. The work area and work surfaces should be kept clean of scraps, liquids, and unnecessary equipment.
10. Anyone caught abusing the equipment, or intentionally trying to harm another student in any way will be dismissed from this class immediately.
11. Wear proper ear protection. Plugs will be supplied by the school.
12. Even though the school has a no hat policy, students may wear hats in the welding area to protect your hair from flying spark, soot, etc.

GENERAL OUTLINE

1. Welding Safety
   1. Eye Protection
   2. Hearing safety
   3. Burns
   4. Equipment safety
2. Oxy-Acetylene
   1. On/Off
   2. Cutting Torch
3. Plasma Cutter
   1. Use
   2. Repair
   3. Safety
4. AC/DC Welding
   1. AC Welding
      * 1. 6013 Rod, 6011 Penetrating Rod
        2. Amperage Settings and Equipment Parts
        3. Safety
        4. Strong Welds/Weak Welds
   2. DC Welding

1. 7018 or 6013 Rod

2. Amperage Settings and Equipment Parts

3. Safety

4. Strong/Weak Welds

V. MIG Welding/Wire Feed

1. Equipment Parts
   1. Changing the wire
   2. Fixing a stuck tip
   3. Troubleshooting when gun does not work
   4. Gas diffuser, tip, tip cover, ground clamp, nozzle gel, welding debris inside tip cover.
2. Welder Settings
   1. Wire Feed (speed)
   2. Amperage (heat)
3. Safety
4. Strong/Weak Welds
5. Gas

VI. Band Saw

1. Parts
2. Usage
3. Safety

VII. Grinders

1. Small Hand
2. Large Hand
3. Wire Wheel
4. Grinding Wheel

VIII. Math

1. Fractions
2. Weight of metal/cost

IX. Blueprint Reading

1. Basic welding symbols
2. Basic linetypes

X. Chop Saw

A. Parts

B. Usage

C. Safety

XI. Iron Worker

1. Parts
2. Usage
3. Safety

XII. Tungsten Arc Welding (GTAW)

1. Parts
2. Usage
3. Safety

COURSE STANDARDS

AWT1.1 Identify and demonstrate the proper industry safety standards.

AWT2.1 Correctly interprets dimensions and locations of components in construction and fabrication drawings.  
AWT2.2 Correctly scale dimensions in construction and fabrication drawings.

AWT2.3 Correctly interprets orthographic views shown in construction and fabrication drawings.

AWT2.4 Recognize and correctly interpret lines and symbols commonly used in construction and fabrication drawings.

AWT3.1 Prepare base metal for various welding processes.

AWT4.1 Identify and understand GMAW equipment and setup.

AWT4.2 Demonstrate knowledge of Gas Metal Arc Welding (GMAW) process.

AWT5.1 Understand GTAW equipment and filler metals.

AWT5.2 Demonstrate knowledge of Gas Tungsten Arc Welding (GTAW).

AWT6.1 Identify and demonstrate knowledge of quality control of the welding process.

AWT7.1 Research career opportunities in the manufacturing fields.