Welding 1 Course Syllabus

Mitchell Career and Technical Education Academy

Assignment Code 13207

Mr. Zard

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COURSE DESCRIPTION

**Welding 1**

½ Credit Elective Grade Level: 9 10 11 12

This course offers students an introduction to welding in a hands-on environment. Students will be taught the fundamentals of (SMAW) Shielded Metal Arc Welding and (GMAW) Gas Metal Arc Welding. They will also learn to operate the oxy-Acetylene cutting torch, plasma cutter and various other tools of the welding trade. Students will take part in career exploration activities and explore the wide variety of career opportunities in the welding field. Welding and the operation of shop equipment will be carried out with an emphasis on safety. Safety training must be completed before students are allowed to operate any lab equipment.

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

**Required Supplies**

* Pencils/Pens
* Notebook
* Folders for Handouts

LEARNING OBJECTIVES

* Work in the shop area in a safe manner 100% of the time
* Identify a good weld 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
* Identify different cylinders that are located in the welding shop environment and understand what each type of gas is used for
* Demonstrate the safety involved in using stationary and hand grinders

ASSSESSMENT PLAN

**Student Evaluation Process**

Projects/Lab Points

Weld Joints

Questions/Quizzes

**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; this includes talking during a semester test.

**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

**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

COURSE STANDARDS

**IWT1.1** Identify and demonstrate the proper industry safety standards.

**IWT2.1** Demonstrate mathematical skills related to work assignments.

**IWT2.2** Read and demonstrate understanding of welding terms and definitions from ANSI/AWS A3.0, *Standard Welding Terms and Definition*

**IWT2.3** Complete a job assignment given verbal and written work assignments.

**IWT3.1** Read and sketch drawings.

**IWT3.2** Identify basic weld symbols.

**IWT3.3** Identify lines and joints.

**IWT4.1**  Identify and explain the use of oxy-fuel cutting equipment.

**IWT4.2** Prepare layouts for cutting individual parts.

**IWT4.3** Perform cuts using oxy-fuel gas-cutting process.

**IWT4.4** Use weld-washing techniques.

**IWT5.1** Prepare base metal for various welding processes.

**IWT6.1** Identify and understand SMAW equipment setup.

**IWT6.2** Identify and understand Shielded Metal Arc electrodes.

**IWT6.3** Demonstrate knowledge of Shielded Metal Arc Welding (SMAW) process.

**IWT7.1** Identify and demonstrate knowledge of quality control of the welding process.

**IWT8.1** Research career opportunities in the manufacturing fields.