

WELD 0003A - INTRODUCTION TO GAS WELDING - PREPARING FOR GTAW

Catalog Description

Formerly known as WELD 10

Hours: 72 (18 lecture, 54 laboratory)

Description: History and development of joining metals, metalworking, and gas welding methods. Students will learn the fundamentals of Oxyacetylene gas welding and gain manipulative skills that will prepare them for Gas Tungsten Arc Welding. Creativity, gas welding and fabrication techniques will be utilized to complete a student project. (CSU)

Course Student Learning Outcomes

- CSLO #1: Apply knowledge of safety standards for both a learning environment and work site environment with focus on Oxy-Acetylene welding, hand and power tool equipment used in the building of assigned student project.
- CSLO #2: Define terms related to this course; abrasive, acetylene, backfire, band saw, brazing, center punch, leaf brake, MSDS - Material Safety Sheets, neutral flame, power punch, PPE - Personnel Protective Equipment, twist drill, rivet, RPM - Revolutions per Minute, tap & die set.
- CSLO #3: Produce manipulative skills of basic Oxy-Acetylene welding, hand and power tools used in the construction of assigned student project.
- CSLO #4: Compare historical development of non-electric welding processes used by blacksmiths and Oxy-fuel welding methods.

Effective Term

Fall 2019

Course Type

Credit - Degree-applicable

Contact Hours

72

Outside of Class Hours

36

Total Student Learning Hours

108

Course Objectives

Lecture Objectives:

1. Establish expectation standards for proper and safe use of general metal working hand tools and power equipment.
2. Discuss and follow the standards of proper and safe use of Oxy-Acetylene welding process.
3. Define and review welding and metalworking tool terms covered in course.

4. Practice shop math of addition, subtraction, multiplication and division of basic fractions.
5. Review of historical welding methods used before the advent of electrical arc methods.
6. Compare use of Oxy-fuel and Electric Arc methods.
7. Describe the difference between iron and steel.
8. Contrast current steel manufacturing methods.
9. Identify the ways steel was manufactured in the past.
10. Differentiate the forging of iron to modern steel forming.

Laboratory Objectives:

1. Employ safe practices when using related metalworking hand tools and power equipment. Safely use the metal cutting equipment, such as tin snips, hack saw, foot shear, cold cut metal saw, band saw and metal notcher.
2. Safely use metal bending and forming equipment such as leaf brakes, box and pan brakes.
3. Apply and practice safe practices when using the Oxy-Acetylene welding process.
4. Demonstrate use of Oxygen and Acetylene cylinders, regulators, check valves, torches, tips and hoses.
5. Apply and demonstrate the Oxy-Acetylene (Gas) Welding practice in flat, horizontal, and vertical position.
6. Operate drilling equipment, such as the hand drill and drill press, as well as metal hole punching tools and machines.
7. Use Tap and Die to thread a hole and fit bolt.
8. Demonstrate proper use of metal removal equipment (cold), such as hand file, and hot such as a bench grinder, hand held grinder to blend and finish metal.
9. Use and relate the terms used in this course for the metalworking and welding applications.
10. Identify and perform the basic math functions required to construct the assigned lab project; addition and subtraction of fractions and mixed numbers, multiplication and division of fractions and mixed numbers in use with measuring instruments, such as tape measure, slide square, and carpenter's square.
11. Complete assigned project following provided drawings and instruction along with the safe and proper use of the tools machines, and welders.
12. Properly demonstrate tool, equipment care and maintenance.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Projects
 - Example: 1. As the student is assembling their assigned project, they will create an individualized aspect that demonstrates a sense of artistic development. Student will be graded on a rubric that includes both following blueprints and additional artistic components for the project.
- Skill Demonstrations
 - Example: 1. Student will be tested in written format as well as demonstrate safe practices to operate metal working and listed welding equipment. a. Measuring instruments, such as tape

measure, caliper, micrometer; b. Drilling equipment, such as hand drill, drill press, metal hole punch; c. Use of Tap and Die; d. Metal removal equipment (cold), such as hand file, bench grinder, hand grinder; e. Metal cutting equipment, such as tin snips, foot shear, power shear, abrasive chop saw, hack saw, band saw, metal notcher; f. Metal bending equipment such as leaf brakes, press brakes, Hossfelt Bender, slip rolls; g. Oxy-Fuel cylinders, regulators, torches, tips and hoses; h. Equipment care and maintenance.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. With instructor demonstration and oversight, students will operate various types of metal working equipment.
2. With instructor demonstration and oversight, students will develop Oxy-Acetylene welding skill sets.
3. Following class lecture, video presentation, and lab demonstration, student will practice manipulative skills in the welding process application.

Lecture:

1. Lecture and small group discussion of the uses of metal in the modern day.

Distance Learning

1. Instructor will use slide show presentation, instructor created video, or lecture presentation on a learning platform to teach about best safety practices in the for personal protective equipment, the weld lab environment, and/or tools & equipment. Students will be given a scenario and expected to list the best safety practices that should be employed and explain why they should be used. Students will submit the assignment via text entry, file upload, video or audio recording.

Typical Out of Class Assignments

Reading Assignments

1. Read about the history of metals before the 20th century in print and web-based material. Be prepared to discuss in class the development of welding as it applies to the Industrial Revolution. 2. Read text chapter on Oxy-Acetylene welding, equipment and components and be prepared to discuss. Compare with contemporary practices.

Writing, Problem Solving or Performance

1. Complete the assigned hands-on competency in each metalwork and welding portion of the individual course project. For example, the student will practice gas welding until they pass a proficiency examination. 2. Demonstrate the safe use of the equipment and tools used in the metal working shop. For example, the student will practice the steps in the safe operation of a drill press.

Other (Term projects, research papers, portfolios, etc.)

1. Each student to complete the assigned course project, such as Hibachi grill or similar object.

Required Materials

- Welding Principles and Practices
 - Author: Edward R. Bohnart
 - Publisher: McGraw-Hill
 - Publication Date: 2017
 - Text Edition: 5th
 - Classic Textbook?:
 - OER Link:
 - OER:
- Modern Welding
 - Author: A.Althouse, C.Turnquist, W.Bowdich, K.Bowdich, M.Bowdich
 - Publisher: Goodheart Willcox
 - Publication Date: 2013
 - Text Edition: 11th
 - Classic Textbook?:
 - OER Link:
 - OER:
- Welding: Principles and Applications
 - Author: Larry F. Jeffus
 - Publisher: Delmar / Cengage Learning
 - Publication Date: 2011
 - Text Edition: 7th
 - Classic Textbook?:
 - OER Link:
 - OER:
- Oxyfuel Gas Welding
 - Author: Kevin E. Bowditch & Mark A. Bowditch
 - Publisher: Goodheart-Willcox
 - Publication Date: 2012
 - Text Edition: 7th
 - Classic Textbook?:
 - OER Link:
 - OER:
- Math for Welders
 - Author: Nino Marion
 - Publisher: Goodheart-Willcox
 - Publication Date: 2006
 - Text Edition: 4th
 - Classic Textbook?:
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.