WELD A100: ARC & OXY-ACETYLENE WELDING

Item	Value
Curriculum Committee Approval Date	04/12/2023
Top Code	095650 - Welding Technology
Units	3 Total Units
Hours	108 Total Hours (Lecture Hours 36; Lab Hours 72)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

Beginning course in arc and oxy-acetylene welding that covers safety practices, use of equipment, brazing and cutting operations, and applications to various types of steels. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Cut various metals utilizing oxygen-fuel, carbon arc and plasma arc processes.
2. Join steel utilizing the oxygen acetylene welding process.
3. Manipulate arc welding equipment by striking an arc and running weld beads with various welding electrodes.

Course Objectives

- 1. Demonstrate an understanding of basic welding processes and theory.
- 2. Demonstrate entry level welding skills with oxygen acetylene.
- 3. Demonstrate entry level joint design and preparation.
- 4. Set up and adjust oxygen acetylene welding equipment.
- 5. Weld using oxygen acetylene welding equipment.
- 6. Set up and adjust oxygen acetylene cutting equipment.
- 7. Cut metal using oxygen acetylene cutting equipment.
- 8. Set up oxygen fuel cutting equipment.
- 9. Cut metals with the oxygen fuel cutting equipment.
- 10. Set up and adjust various types of thermal cutting equipment.
- 11. Cut various metals using thermal cutting equipment.
- 12. Braze and braze weld to an entry level job requirement.
- 13. Correctly identify welding machines.
- 14. Identify polarity and adjust the welding power source to correct polarity.
- 15. Strike an arc with a shielded metal arc welding electrode.
- 16. Run a welding bead with various shielded metal arc welding electrodes.
- 17. Join metal utilizing the three basic welds beads, fillets and grooves.
- 18. Weld various geometric joints.
- 19. Weld joint in the flat, horizontal, vertical and over-head positions.

Lecture Content

Welding Defined and Welding History Welding Safety Welding Safety Hazards Personal Protective Equipment General safety Rules Oxy-Acetylene Welding Oxy Acetylene Torch Types Welding Tip Size and Selection Pressure Regulators Hoses Compressed Gas Cylinders Oxygen Acetylene Acetylene Generators Gas Manifolds Compressed Gas Safety Equipment Flashback Arrestors Check Valves Oxy-Acetylene Welding Flames Neutral Oxidizing Carburizing Filler Metals Steel Other metals Oxy-Fuel Cutting Fuel Gasses Acetylene Propane Natural Gas Others Oxy Fuel Cutting Torch Types Cutting Tip Size and Selection Pressure Regulators Hoses Oxy-Fuel Cutting Theory Automated Cutting Cutting Guides Shielded metal Arc Welding Welding Power Supplies Constant Voltage Constant Current Welding Polarities Direct Current Electrode Positive Direct Current Electrode Negative Alternating Current Welding Cables Electrode Holder Work Lead Remote Amperage Controls Shielded Metal Arc Welding Eectrodes Steel Stainless Steel Other Metals Electrode Operation Gas Metal Arc Welding Power Supply Welding Guns Push Type Push-Pull Type Spool Guns Shielding Gasses Argon Carbon Dioxide Gas Mixtures Metal Transfer Modes Short Circuit Transfer Gloublar Transfer Spray Transfer Pulsed Spray Transfer Advanced Transfer Modes RMD STT Cold Metal Transfer Filler Metals Steel Stainless Steel Other Metals Gas Tungsten Arc Welding Power Supply Gas Tungsten Arc Welding Torches Water Cooled Air Cooled Shielding Gasses Argon Helium Other Gasses Tungsten Electrodes Types Applications Welding Polarities Filler Metals Steel Stainless Steel Aluminum Air Carbon Arc Cutting Equipment Applications Plasma Arc Cutting Equipment Gas Types and Applications Automation Soldering and Brazing Applications Equipment Filler Metals Flux Heating Methods Joint Design and Preparation Groove Welds Fillet Welds Joint Penetration Complete Joint Penetration Partial Joint Penetration Selection of Joint Preparation Welding Symbols and Blueprint Reading

Lab Content

Oxy-Acetylene Welding Surfacing Welds Corner Joints Lap Joints Tee Joints Butt Joints Welding in- and out-of-position Shielded Metal Arc Welding Surfacing Welds with F2 and F3 electrodes Groove welds with F1, F2, F3, and F4 electrodes Welding in- and out-of-position Oxy-Fuel Cutting Manual Oxy-Acetylene Cutting Manual Oxy-Propane Cutting Automatic Cutting Plasma Arc Cutting Air Carbon Arc Cutting Gas Metal Arc Welding Surfacing Welds Gas Tungsten Arc Welding Surfacing Welds Welding Automation Orbital Tube Welding Friction Stir Welding Automated Plasma Arc Cutting Brazing and Soldering Lap Joints Braze Welding

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

Instructional Techniques

Lecture, textbook reading assignments, demonstrations, constructive evaluation and critique

Reading Assignments

Students will spend approximately two hours per week completing reading assignments from the textbook.

Writing Assignments

Students will spend approximately two hours per week completing written homework assignments.

Out-of-class Assignments

Students will spend approximately 30 minutes per week researching welding processes and welding carreer opportunities.

Demonstration of Critical Thinking

Competency-based skill evaluation and written exams

Required Writing, Problem Solving, Skills Demonstration

Written examinations Skill development demonstrations and evaluation

Eligible Disciplines

Welding: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Althouse, A.D.,Turnquist, C.H., Bowditch, W.A.. Modern Welding, 12th ed. Goodheart-Wilcox, 2020