WELD A201: ADVANCED WELDING

Item	Value
Curriculum Committee Approval Date	04/12/2023
Top Code	095650 - Welding Technology
Units	4 Total Units
Hours	144 Total Hours (Lecture Hours 36; Lab Hours 108)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

Advanced welding theory and practice, covering thermal cutting, oxy-acetylene welding and welding of ferrous and non-ferrous metals, qualification and certification requirements to Los Angeles City and the American National Standards Institute. May also enroll in WELD A215 for additional laboratory units. Each 54 hours of laboratory time earns one unit. Will be given credit for the laboratory course appropriate for the number of hours worked. Enrollment Limitation: WELD A200; students who complete WELD A201 may not enroll in or receive credit for WELD A200. PREREQUISITE: WELD A100 or WELD A101. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Join metals utilizing one of the welding processes (SMAW, GMAW, FCAW or GTAW).
2. Weld metals in and out-of-position.
3. Set up and use various welding and cutting apparatus.
4. Correctly set up and use a constant current welding machine (SMAW and GTAW).
5. Correctly set up and use a constant voltage welding machine (GMAW FCAW).
6. Prepare metals for welding.

Course Objectives

- 1. Demonstrate an understanding and practice of personal welding safety.
- 2. Demonstrate safe use of arc welding machines.
- 3. Demonstrate safe use of oxygen acetylene cutting equipment.
- 4. Demonstrate an understanding of arc welding polarity.
- 5. Demonstrate an understanding of constant current welders.
- 6. Demonstrate an understanding of constant voltage welders.
- 7. Demonstrate an understanding of alternating current.
- 8. Demonstrate an understanding of air arc gouging.
- 9. Demonstrate the brazing and braze welding applications.
- 10. Demonstrate the ability to solder.
- 11. Demonstrate an understanding of SMAW, GMAW, GTAW, and FCAW theories.
- 12. Demonstrate the ability to join metals using either SMAW, GMAW, FCAW or GTAW.
- 13. Demonstrate the ability to join metals in and out of position.
- 14. Prepare metals for various geometric joints prior to welding

Lecture Content

Safety General safety rules Welding Equipment safety Personal safety in welding How to Begin Oxy-acetylene How to hook-up and adjust equipment Flame adjustment Running a bead on a flat plate (includes safety precautions) Definition of Welding History of Welding Ancient time Modern time Oxy-acetylene Equipment and Supplies Complete oxy-acetylene outfit Oxy-acetylene torch Pressure regulators and gauges Gas cylinders Oxygen Acetylene Safety factors Manifolds Flashback arrestors Acetylene generators Hoses and welding accessories Welding rod (gas) Fluxes Tools DC Arc Welding Equipment and Supplies Arc welding station Machines Cables and electrode holders Electrode types and classification Remote controls Accessories and safety equipment Oxy-acetylene Theory and Practice Soldering and brazing Types of welding and cutting Flames Safe handling of equipment Selection of tips Torch position and movements Puddling Types of welding joints Use and selection of welding rod Welding positions Multi-pass welds Fume hazards DC Arc Welding Fundamentals Circuits Polarity Electrode selection Electrode motions Types of welding joints Arc blow Weld faults Edge preparations All position welding Oxy-acetylene Cutting Equipment and Supplies Cutting assembly Cutting torch and attachments Tips Regulators Guides: mechanical, electric, tracers Multi head torches Oxy-acetylene Cutting How the flame cuts Safety procedures AC Arc Welding Equipment and Supplies Machines AC, DC machines AC electrodes AC Arc Welding Characteristics of alternating current Advantages Arc Cutting Carbon arc Metal electrode arc cutting Air-metallic arc cutting Air-carbon cutting and gauging Oxygen-arc cutting Safety procedures Equipment and supplies Plasma Arc Cutting Plasma arc theory Plasma torch assembly Equipment operation Soldering Principles Alloys Fluxes Procedures Copper method Torch method Brazing and braze welding Principles Alloys Fluxes Procedures and preparation Joint design Other Welding and Joining Processes Submerged Arc welding Stud welding Arc spot welding Underwater welding Atomic hydrogen welding Plasma arc welding Forge welding Electron beam welding Laser beam welding Friction welding Welding Shop Equipment Stations Ventilation Welding Dos and Donts

Lab Content

See Course Content.

Method(s) of Instruction

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

Instructional Techniques

Lecture, textbook reading assignments, demonstrations, skills development tests to welding industry standards

Reading Assignments

Written examinations and skill proficiency test to welding industrial codes and standards

Writing Assignments

Written examinations and skill proficiency test to welding industrial codes and standards

Out-of-class Assignments

Written examinations and skill proficiency test to welding industrial codes and standards

Demonstration of Critical Thinking

Written exams and skills demonstration

Required Writing, Problem Solving, Skills Demonstration

Written examinations and skill proficiency test to welding industrial codes and standards

Textbooks Resources

1. Required Galvery, William and Frank Marlow. Welding Essentials: Questions and Answers , 2nd ed. New York: Industrial Press, 2007

Other Resources

1. Selected handout materials to be provided and distributed by instructor Orange Coast College welding safety test