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COCONINO COMMUNITY COLLEGE

COURSE OUTLINE

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Status: Permanent

Date: November 21, 1993
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A. Identification:

1. Subject Area: Welding
2. Course Number: WLD 106
3. Course Title: Intermediate Welding
4. Credit Hrs: 3
5. Catalog Description

Advanced arc welding procedures, equipment, and safety techniques. Instruction in the selection of electrode, gas, cups, and filler rod for gas tungsten arc weld (GTAW) welding. Techniques and practice in welding butt-joint, t-joint, lap and corner joints in various positions and numerous cutting procedures. Prerequisite: WLD 102 or consent of instructor. Two lecture; two lab.

B. Course Goals:

This course is designed for students who are seeking progressive training to become a more skilled worker in the trades that require advanced Arc Welding skills. This course provides students with enhanced knowledge and hands-on experience in advanced arc welding, gas tungsten arc weld (GTAW), including the use and selection of the approximate equipment, safety rules and procedures, and more complex methods of arc welding in various positions.

C. Course Outcomes:

Students will:

1. Identify and follow shop policies and procedures, clean and maintain work area and leave in a safe condition, and clean and store hand tools, cutters, fixtures, attachments, etc.
2. Identify and follow general shop safety rules and procedures, identify and use shop protective equipment, recognize and identify danger areas in a welding shop, practice arc welding safety, exhibit personal safety awareness, report hazards, and dispose of scrap metal chips, shavings trash and waste.
3. Select shielded metal arc welding (SMAW) equipment including:
 - A. Selecting electrodes appropriate to job
 - B. Set up SMAW equipment
 - C. Perform minor maintenance on SMAW equipment
 - D. Calculate amperage settings for electrodes of a given diameter and classification
 - E. Determine polarity from electrode manual or chart.
4. Remove slag from a weld, mechanical and manual, inspect and test welds, and perform grinding operations.
5. Make the following horizontal positions welds:
 - A. Lap joint, E7024, 3/8" plate
 - B. Lap joint, E7018, 3/8" plate
 - C. Lap joint, E6010, 3/8" plate
 - D. Single V-groove butt, 3/8" plate (with backing strip)
 - E. Single V-groove butt, 3/8" plate (without backing strip)
 - F. Prepare, test, and evaluate guided bend test single V-groove (without backing strip)
6. Make the following vertical down position welds:
 - A. T joint, E6010, 3/8" plate
 - B. Single V-groove butt 3/8" plate (without backing strip), E6010
 - C. Prepare, test and evaluate guided bend test single V-groove (without backing strip)

7. Make the following Overhead Position welds:
 - A. T joint, E7018, 3/8" plate
 - B. T joint, E6010, 3/8" plate
 - C. Single V-groove butt 3/8" plate (with backing strip), E7018
 - D. Single V-groove butt 3/8" plate (without backing strip), E6010 and E7018
 - E. Prepare, test and evaluate guided bend test single V-groove (without backing strip)
8. Perform the following cutting operations and setup of equipment:
 - A. Cut and piece metal with O.F.C. equipment
 - B. Set up air carbon arc equipment
 - C. Cut carbon steel with air carbon arc equipment
 - D. Set up plasma arc cutting equipment (PAC)
 - E. Cut metals by hand using plasma arc cutting equipment (PAC)
9. Arc weld cast iron
10. Pass AWS certification standard in all positions using E6010 electrodes
11. List causes and effects of distortion
12. Demonstrate techniques for controlling distortion
13. Pass AWS certification standard in all positions using E7018 electrodes
14. Demonstrate the ability to control arc blow
15. Demonstrate the use of the carbon arc torch
16. Demonstrate knowledge of gas tungsten arc weld (GTAW) welding:
 - A. Explain the TIG welding process
 - B. List and define the TIG welding terminologies
 - C. Set up supply for AC or DC and start welding machine
 - D. Set up, select and adjust current for welding, adjust electrode to correct stick out
 - E. Select and prepare electrode, filler metal, gases and cups
 - F. Weld butt (overlay) in horizontal, vertical and overhead positions
 - G. Fillet weld in horizontal, vertical and overhead positions
 - H. Weld a lap weld, a T-fillet weld, a square groove butt joint, and a V-groove butt joint on 11 ga and 16 ga stainless steel in a flat, horizontal, vertical and overhead positions
 - I. Weld 16ga stainless steel in a flat, horizontal, vertical and overhead positions
 - J. Weld 11 ga aluminum in flat, horizontal, vertical and overhead positions

D. Course Content:

Will include:

1. Safety in shielded metal arc welding and shop procedures
2. Multiple pass welds in all positions
3. Open V-groove butt welds in all positions
4. Backing B-groove welds in all positions
5. Prepare, test and evaluate V-groove bend specimens
6. Cutting with carbon arc and plasma cutting equipment