

Bossier Parish Community College
Master Syllabus

Course Prefix and Number: WELD 106

Credit Hours: 4-3-3

Course Title: Advanced Welding II

Course Prerequisites: READ 099; MATH 098; Prior Welding experience and/or education is required; Instructor Permission required

Textbook: Modern Welding Common Cartridge - ISBN 978-1-63563-888-2: 12th edition, Goodheart Wilcox Publisher.

Course Description: This course covers the knowledge, skills, and abilities required of an AWS Certified Level III Expert Welder including welding safety, supervision and management principles, welding codes and standards for inspection, metal fabrication methods, welding metallurgy, and welding principles for shielded metal arc welding, gas metal arc welding, flux cored arc welding, and gas tungsten arc welding.

Learning Outcomes:

At the end of this course, the student will:

- A. demonstrate knowledge of welding safety and health including safe practices and the effects of welding on health;
- B. demonstrate an understanding of supervision and management principles and practices in the welding industry;
- C. demonstrate an understanding of the documents governing welding and welding inspection including an understanding of welding codes and standards;
- D. demonstrate competency in welded metal fabrication methods;
- E. apply principles of welding metallurgy to welding, fabrication, and inspection; and
- F. demonstrate the ability to use arc welding principles and practices including: welding theory, shielded metal arc welding (SMAW), gas metal arc welding (GMAW, GMAW-S), flux cored arc welding (FCAW-S, FCAW-G), and gas tungsten arc welding (GTAW).

To achieve the learning outcomes, the student will or will be able to:

(The letter designations at the end of each statement refer to the learning outcome(s).)

1. follow safe practices; (A)
2. recognize the effects of welding on health; (A)
3. supervise other personnel during fabrication and welding operations; (B)
4. administer hands-on training; (B)
5. participate in the selection and specification of equipment purchases; (B)
6. estimate welding and material costs and quantities; (B)
7. locate essential welding information from Welding Procedure Specifications

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- (WPS's); (C)
8. locate essential welding and inspection information from AWS D1.1, *Structural Welding Code – Steel*; (C)
 9. locate essential welding and inspection information from API Standard 1104, *Standard for Welding Pipelines and Related Facilities*; (C)
 10. locate essential welding and inspection information from ASME, *Boiler and Pressure Vessel Code – Section IX*; (C)
 11. interpret destructive and nondestructive test results; (C)
 12. prepare inspection reports; (C)
 13. perform visual examination; (C)
 14. perform bend testing; (C)
 15. perform penetrant testing; (C)
 16. perform magnetic particle testing; (C)
 17. troubleshoot fabrication setups and processes; (D)
 18. interpret welding, nondestructive examination and piping symbols; (D)
 19. layout parts using advanced measurement practices; (D)
 20. fabricate weldments from complex drawings; (D)
 21. fabricate jigs and fixtures; (D)
 22. apply principles of welding metallurgy to welding fabrication and inspection; (E)
 23. apply principles of metal properties to welding, fabrication and inspection; (E)
 24. apply principles related to residual stress and distortion to welding, fabrication, and inspection; (E)
 25. apply principles related to alloy weldability to welding, fabrication, and inspection; (E)
 26. apply principles of joint design and preparation to welding, fabrication, and inspection; (F)
 27. apply principles of material selection to welding, fabrication, and inspection; (F)
 28. apply principles of welding applications to welding, fabrication, and inspection; (F)
 29. apply principles of weld quality and repairs to welding, fabrication, and inspection; (F)
 30. perform safety inspections of equipment and accessories; (F)
 31. make minor external repairs to equipment and accessories; (F)
 32. set up components and accessories of a complete shielded metal arc welding system; (F)
 33. operate shielded metal arc welding equipment; (F)
 34. execute corrective actions to repair surface flaws on welds and base metals; (F)
 35. perform a 6GR unlimited thickness range performance qualification test on carbon steel pipe; (F)
 36. perform a 6G limited thickness range performance qualification test on carbon steel or 300 series steel pipe using stainless steel electrodes; (F)
 37. set up components and accessories of a complete gas metal arc welding system; (F)
 38. set up for gas metal arc welding operations; (F)
 39. operate gas metal arc welding equipment; (F)
 40. perform a 6G limited thickness range performance qualification test on carbon steel pipe (short circuit transfer); (F)
 41. perform a 6G limited thickness range performance qualification test on aluminum

- pipe (pulsed spray transfer); (F)
42. set up components and accessories of a complete flux cored arc welding system; (F)
 43. set up for flux cored arc welding operations; (F)
 44. operate flux cored arc welding equipment;(F)
 45. perform a 6G unlimited thickness range performance qualification test on carbon steel pipe (self-shielded); (F).
 46. perform a 6G unlimited thickness range performance qualification test on carbon steel pipe (gas-shielded); (F)
 47. set up components and accessories of a complete gas tungsten arc welding system; (F)
 48. set up for gas tungsten arc welding operations; (F)
 49. operate gas tungsten arc welding equipment; (F)
 50. make 2F and 1G fillet and groove welds on nickel alloys; (F)
 51. make 2F and 1G fillet and groove welds on copper alloys; (F)
 52. make 2F and 1G fillet and groove welds on magnesium and/or titanium alloys; (F)
 53. perform a 6G limited thickness range performance qualification test on carbon steel round tubing or pipe; (F)
 54. perform two 6G limited thickness range performance qualification test on carbon steel or stainless steel round tubing or pipe using stainless steel filler metals; (F) and
 55. perform a 6G limited thickness range performance qualification test on aluminum round tubing or pipe; (F)

Course Requirements: Complete all homework assignments, in-class equipment exercises, in class tests, and final exam.

Course Grading Scale:

- 90 – 100 = A
80 – 89 = B
70 – 79 = C
60 – 69 = D
0 – 59 = F

Attendance Policy: The college attendance policy is available at <http://www.bpcc.edu/catalog/current/academicpolicies.html>

Course Fees: This course is accompanied with an additional non-refundable fee for supplemental materials, laboratory supplies, software licenses, certification exams and/or clinical fees.

Nondiscrimination Statement: Bossier Parish Community College does not discriminate on the basis of race, color, national origin, gender, age, religion, qualified disability, marital status, veteran's status, or sexual orientation in admission to its programs, services, or activities, in access to them, in treatment of individuals, or in any aspect of its operations. Bossier Parish Community College does not discriminate in its hiring or employment practices.

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