

## **COURSE SYLLABUS**

<b>LAST REVIEW</b>	Fall 2022
<b>COURSE TITLE</b>	Metal Fabrication and Joinery
<b>COURSE NUMBER</b>	BEMT 0181
<b>DIVISION</b>	Career and Technical Education
<b>DEPARTMENT</b>	BEMT
<b>CIP CODE</b>	46.0401
<b>CREDIT HOURS</b>	2
<b>CONTACT HOURS/WEEK</b>	Class: .5                      Lab: 3
<b>PREREQUISITES</b>	BEMT 0115

### **COURSE DESCRIPTION**

Through classroom and/or shop/lab learning and assessment activities, students in the course will: explain gas metal arc welding process (GMAW); demonstrate the safe and correct set up of the GMAW workstation; correlate GMAW electrode classifications with base metals and joint criteria; demonstrate proper electrode selection and use based on metal types and thicknesses; build pads of weld beads with selected electrodes in the flat position; build pads of weld beads with selected electrodes in the horizontal position; produce basic GMAW welds on selected weld joints; and conduct visual inspection of GMAW welds.

### **PROGRAM LEARNING OUTCOMES**

Students will demonstrate an adherence to safety standards and proficiency in the installation or repair of residential electrical, plumbing, HVAC, exterior building materials, roofing, irrigation systems, landscape/hardscape, concrete placement and finish, masonry install and repair.

### **TEXTBOOKS**

<http://kckccbookstore.com/>

### **METHODS OF INSTRUCTION**

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

### **COURSE OUTLINE**

I. GMAW Processes and equipment

- A. GMAW equipment
  - 1. Welding station components
  - 2. Power sources
  - 3. Wire feeders
  - 4. Welding guns
- B. GMAW process theory
  - 1. Machine settings
  - 2. Electrode specifications
  - 3. Metal transfer
  - 4. Shielding gasses
- II. GMAW welding in the flat position
  - A. Fillet welds (1F)
  - B. Groove welds (1G)
- III. GMAW welding in the horizontal position
  - A. Fillet welds (2F)
  - B. Groove welds (2G)
- IV. Weld inspection
  - A. GMAW visual inspection
    - 1. Visual inspection criteria
    - 2. Common discontinuities in flat and horizontal positions
  - B. GMAW destructive weld testing
    - 1. Weld test joint set up
    - 2. Preparing test specimens
    - 3. Destructive test criteria

## **COURSE LEARNING OUTCOMES AND COMPETENCIES**

Upon successful completion of this course, the student will:

- A. Explain gas metal arc welding process (GMAW).
  - 1. Describe different modes of transfer
  - 2. Differentiate between types and uses of current
  - 3. Identify the advantages and disadvantages of GMAW
  - 4. Identify types of welding power sources
  - 5. Identify different components of a GMAW station
  - 6. Describe basic electrical safety
- B. Demonstrate the safe and correct set up of the GMAW workstation.
  - 7. Demonstrate proper inspection of equipment
  - 8. Demonstrate proper use of PPE
  - 9. Demonstrate proper placement of workpiece connection
  - 10. Check for proper setup of equipment
  - 11. Inspect area for potential hazards/safety issues
  - 12. Troubleshoot the GMAW equipment and perform minor maintenance
- C. Correlate GMAW electrode classifications with base metals and joint criteria.

13. Explain the AWS electrode nomenclature
  14. Determine proper electrode for given joint based on material and position of weld
  15. Determine proper type of electrodes to be used in a variety of industry applications
  16. Identify proper electrode storage and handling
  17. Identify consumables
- D. Demonstrate proper electrode selection and use based on metal types and thicknesses
18. Identify consumables for various electrode sizes
  19. Select the proper electrode type and size relative to metal size, type and thickness
  20. Select the proper electrode type and size based on material specifications
- E. Build pads of weld beads with selected electrodes in the flat position.
21. Implement safety procedures and PPE
  22. Implement proper equipment setup
  23. Use the proper metal transfer
  24. Create a pad of beads using GMAW
  25. Weld exhibits proper uniformity and profile
- F. Build pads of weld beads with selected electrodes in the horizontal position.
26. Implement safety procedures and PPE
  27. Implement proper equipment setup
  28. Use the proper metal transfer
  29. Create a pad of beads using GMAW
  30. Weld exhibits proper uniformity and profile
- G. Produce basic GMAW welds on selected weld joints.
31. Implement safety procedures and PPE
  32. Implement proper equipment setup
  33. Perform fillet weld in flat position
  34. Perform a fillet weld in horizontal position
  35. Perform a groove weld in a flat position
  36. Perform a groove weld in a horizontal position
  37. Use tools appropriate for the task
- H. Conduct visual inspection of GMAW welds.
38. Identify common visual discontinuities and defects on welds
  39. Determine causes of discontinuities and defects of welds
  40. Inspect welds for pass/fail ratings according to industry standards
  41. Use appropriate tools for inspection

## **ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES**

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

## **COLLEGE POLICIES AND PROCEDURES**

*Student Handbook*

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

*College Catalog*

<https://www.kckcc.edu/academics/catalog/index.html>

*College Policies and Statements*

<https://www.kckcc.edu/about/policies-statements/index.html>

*Accessibility and Accommodations*

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.