

## COURSE SYLLABUS

<b>LAST REVIEW</b>	Fall 2022
<b>COURSE TITLE</b>	Aluminum Welding
<b>COURSE NUMBER</b>	WELD 0255
<b>DIVISION</b>	Career and Technical Education
<b>DEPARTMENT</b>	WELD
<b>CIP CODE</b>	48.0508
<b>CREDIT HOURS</b>	4
<b>CONTACT HOURS/WEEK</b>	Class: 1    Lab: 6
<b>PREREQUISITES</b>	WELD 0100

### COURSE DESCRIPTION

Through a variety of classroom and/or shop/lab learning and assessment activities, the students in this course will: learn metal preparation, GMAW, GTAW, safety and metallurgy as they apply to aluminum welding.

### PROGRAM ALIGNMENT

This course is part of a program aligned through the Kansas Board of Regents and Technical Education Authority. For more information, please visit:

[https://kansasregents.org/workforce\\_development/program-alignment](https://kansasregents.org/workforce_development/program-alignment)

### PROGRAM LEARNING OUTCOMES

1. The student will be able to identify high risk areas that should be avoided by operators while automated machinery is running.
2. After completing the program, students will be able to exhibit a high-level of professionalism including appropriate dress, attendance, communication skills and other soft skills necessary
3. The student will be able to demonstrate the ability to successfully complete a welding project.

### TEXTBOOKS

<http://kckccbbookstore.com/>

### METHOD 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 Aluminum Metallurgy
  - A. Properties of aluminum
  - B. Aluminum alloys and their uses
- II. Aluminum inspection
  - A. Weld profiles
  - B. Heat Affected Zone (HAZ)
  - C. Other flaws
- III. GMAW of aluminum
  - A. Flat position fillet welds
  - B. Flat position groove welds
  - C. Horizontal position fillet welds
  - D. Horizontal position groove welds
- IV. GTAW of aluminum
  - A. Flat position fillet welds
  - B. Flat position groove welds
  - C. Horizontal position fillet welds
  - D. Horizontal position groove welds

### **COURSE LEARNING OUTCOMES AND COMPETENCIES**

Upon successful completion of this course, the student will:

- A. Identify various aluminum alloys and their characteristics.
  - 1. Differentiate various aluminum alloys based on alloy naming system.
  - 2. Select proper filler metal for welding aluminum alloys with GMAW.
  - 3. Select proper filler metal for welding aluminum alloys with GTAW.
- B. Perform GMAW welds on aluminum in the flat and horizontal positions.
  - 4. Properly set up GMAW station for welding aluminum.
  - 5. Select proper shielding gasses for welding aluminum alloys with GMAW.
  - 6. Properly layout and tack aluminum coupons for GMAW.
  - 7. Properly prepare surface of aluminum for GMAW.
  - 8. Perform several fillet welds in the flat position to given performance standard.
  - 9. Perform a groove weld on aluminum in the flat position to given performance standard.
  - 10. Perform several fillet welds on aluminum in the horizontal position to given performance standard.
  - 11. Perform a groove weld on aluminum in the horizontal position to given performance standard.
- C. Perform GTAW welds on aluminum in the flat and horizontal positions.
  - 12. Properly set up GTAW station for welding aluminum.
  - 13. Select proper electrode for welding aluminum alloys with GTAW.
  - 14. Prepare electrode for welding aluminum alloys with GTAW.
  - 15. Select proper shielding gasses for welding aluminum alloys with GTAW.
  - 16. Properly layout and tack aluminum coupons for GTAW.
  - 17. Properly prepare surface of aluminum for GTAW.
  - 18. Perform several fillet welds in the flat position to given performance standard.
  - 19. Perform a groove weld on aluminum in the flat position to given performance standard.
  - 20. Perform several fillet welds on aluminum in the horizontal position to given performance standard.

standard.

21. Perform a groove weld on aluminum in the horizontal position to given performance standard.

D. Perform inspections on aluminum welds to check for conformance with specific criteria.

22. Inspect weld beads for profile to determine acceptability to given specification.

23. Inspect GTAW beads to determine if AC balance is in proper place.

24. Inspect weld beads with DPT to determine acceptability to given specification.

25. Inspect GMAW fillet weld with break test or macro etch specimen to determine penetration.

26. Inspect GTAW fillet weld with break test or macro etch specimen to determine penetration.

27. Inspect weld with bend test to determine acceptability to given specification.

## **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>.