



Course Outline

2026-2027 Catalog

MFG 32 - Introduction to Robotic Welding

Catalog Description

Transfer Status: CSU

Prerequisite: MFG 20, MFG 22, MFG 24, MFG 26

Corequisite: MFG 30, MFG 34, MFG 36

Unit(s): 4.00

Lecture: 42.50 Contact hours/85.00 Out of class hours/127.50 Total hours/2.50 Unit(s)

Lab: 76.50 Contact hours/0.00 Out of class hours/76.50 Total hours/1.50 Unit(s)

Total: 119.00 Contact hours/85.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

Course Description: This course is designed to provide an introduction to production welding using a robotic welding process as it relates to advanced manufacturing. Emphasis will be placed on developing safety skills, measuring skills, trade math, communication skills, focus on pulse spray transfer process, filler metals, shielding gases, materials, equipment operation, troubleshooting, and maintenance, drawings, work orders, quality assurance, jigs, and fixtures. These areas of instruction will be reinforced by hands-on application in several performance lab exercises.

Objectives

Upon successful completion of this course, the student should be able to:

1. Practice safety skills that are required on job-sites.
2. Explain the basic principles of the gas metal arc welding pulse spray process.
3. Describe the purpose of fixtures for a robotic welder.
4. Describe the different mixture of shielding gas used with the gas metal arc welding process.
5. Explain the correct use of a jig for a robotic welder.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Introduction and Safety	2.50
Measuring and Applied Trade Math	2.00
Communication Skills	2.00
Equipment Set up and Operation	3.00
Welding Processes	6.00
Types of Transfers	3.00
Types of Filler Materials and Shielding Gases	5.00
Wire Speed Feeds and Gas Pressures	5.00
Types of Materials	3.00
Calculations of Production Time	3.00
Introduction to Jigs and Fixtures	2.00
Equipment Maintenance & Troubleshooting	2.00
Drawings and Work Orders	2.00
Quality Assurance	2.00
Total Hours:	
42.50	

Lab

<u>Topics</u>	<u>Lab Hrs</u>
Introduction and Safety	2.50
Measuring and Applied Trade Math	2.00
Communication Skills	2.00
Equipment Set up and operation	4.00
Welding Processes	9.00
Types of Transfers	8.00
Types of Filler Materials and Shielding Gases	8.00
Wire Speed Feeds and Gas Pressures	7.00

Topics	Lab Hrs
Types of Materials	7.00
Calculations of Production Time	5.00
Introduction to Jigs and Fixtures	5.00
Equipment Maintenance & Troubleshooting	5.00
Drawings and Work Orders	7.00
Quality Assurance	5.00
Total Hours: 76.50	

Methods of Instruction

- A. Demonstrations
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- C. Laboratory Experiments
- D. Lecture
- E. Multimedia Presentations

Methods of Evaluation

- A. Exams/Tests
- B. Quizzes
- C. Homework
- D. Lab Projects

Examples of Assignments

Reading Assignments

1. Read the module introducing jigs and be prepared to discuss in class.
2. Read assigned trade journal article and be prepared to discuss in class.

Writing Assignments

1. Write an order of operations for setup techniques of robotic welding equipment.
2. Write a two-page essay, explaining how the trade journal article can be implemented in workplace safety and how it relates to the class.

Out-of-Class Assignments

1. Research online the proper process for building fixtures for the robotic welder using manufactures publications and be prepared to discuss in class.
2. Research OSHA publications for the use and safety of power tools properly and write a one-page essay.

Recommended Materials of Instruction

Schmid, S., & Kalpakjian, S. (2014). Manufacturing Engineering and Technology. *Pearson, 7th.*

Other Learning Materials

All tools listed in the Advanced Manufacturing Program Guide.

Minimum Qualifications

Machine Tool Technology
Manufacturing Technology

Created/Revised by: Peacock, Miles

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