



Course Outline

2026-2027 Catalog

MFG 42 - Advanced Robotic Welding

Catalog Description

Transfer Status: CSU

Prerequisite: MFG 30, MFG 32, MFG 34, MFG 36

Corequisite: MFG 40, MFG 44, MFG 46

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 develop skills in production welding using a robotic welding process as they relate 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, single and dual sided, drawings, work orders, quality assurance, weld evaluation, 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 jigs for a robotic welder.
4. Define the major components of a robotic welding machine.
5. Describe in detail the proper feeds and speeds setting for the robotic welder for 10 gauge stainless steel.

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 Programing	6.00
Single and Dual Sided Robots	3.00
Fixtures	5.00
Jigs	5.00
Wire Speed Feeds and Gas Pressures	3.00
Calculations of Production Time and Costs	3.00
Weld Evaluation	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 programing	14.00
Single and Dual Sided Robots	4.00
Fixturing	8.00
Jigs	8.00

Topics	Lab Hrs
Wire Speed Feeds and Gas Pressures	4.00
Calculations of Production Time and Costs	4.00
Weld Evaluation	8.00
Equipment Maintenance & Troubleshooting	4.00
Drawings and Work Orders	6.00
Quality Assurance	6.00
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 selection on weld evaluation 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 manufacturer publications for the benefits of robotic welding in manufacturing 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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