

Lassen Community College Course Outline

WT-53 Robotic Welding Operations and Programming (Advanced) 3.0 Units

I. Catalog Description

This course is the second in a two part series that expands on robotic programming. Emphasis will be on robotic welding and ArcTool operations and programming. The course will also demonstrate the proper use of fixturing to secure weldments.

Prerequisite(s): WT-52 and WT-38 or concurrent enrollment in WT-38

Does not transfer to UC/CSU

17 Hours Lecture, 102 Hours Lab. 34 Outside Class Hours, 153 Total Student Learning Hours

Scheduled: Spring

II. Coding Information

Repeatability: Not Repeatable, Take 1 Time

Grading Option: Graded or Credit/No Credit

Credit Type: Credit - Degree Applicable

TOP Code: 095650

III. Course Objectives

A. Course Student Learning Outcomes

Upon completion of this course the student will be able to:

1. Create and run a welding program.
2. Perform a backup and restore all teach pendant programs

B. Course Objectives

Upon completion of this course the student will be able to:

1. Create a user frame using the three-point method.
2. Create position registers – Home, repair and safe position.
3. Modify a motion program.
4. Create and run a counter program.
5. Create and run a welding program using the appropriate welding parameters.
6. Insert a weave instruction into a welding program and run.
7. Modify an existing program as a macro.
8. Adjust a program while it's running in auto.
9. Perform a backup of all teach pendant programs.
10. Load all teach pendant program files into the controller from the backup device
11. Secure weldments using appropriate fixturing techniques.

IV. Course Content

A. Safety and Cycle Power

1. Robotic safety practices
2. Safety devices, inside and outside the robotic cell
3. Operating and programming safety precautions

B. Frames

1. World frame

2. Tool frame
3. User frame
4. Jog frame

C. Motion Instructions

1. Motion types
2. Elements of motion instructions
3. Termination types
4. Adding and deleting motion instructions
5. Motion options

D. Copying and Editing Programs

1. Replacing items
2. Renumbering positional Id's
3. Turning on/off comments
4. Undo function

E. Branching

1. Unconditional branching instructions
2. Conditional branching instructions
3. If and select instructions
4. Wait instructions

F. Instructions-Non Motion and Miscellaneous

1. Remark instructions
2. Override
3. Message
4. Timer instructions

G. Setting Up ArcTool

1. ArcTool program guidelines
2. Weld input/outputs
3. ArcTool instructions
4. Arc weld schedule
5. Weld enable

H. Weaving

1. Weave setup
2. Weave instructions
3. Weave schedule

I. Input and Output (I/O)

1. Types of I/O signals
2. Configuring I/O
3. Monitoring I/O signals

J. Macros

1. Overview of macros
2. Setting up macro commands
3. Assigning a macro

K. TorchMate Options

1. TorchMate overview
2. Setting up TorchMate
3. Calibrate TorchMate tool center point (TCP)
4. File backup vs. image backup and restore

L. Program Adjust

1. Adjust a program running in auto
2. Create a program adjust schedule

M. Program and File Manipulation

1. Copy program files
2. Deleting program files
3. Setting the default storage device
4. Loading a program from a device
5. Image backup and restore.

N. Fixturing

1. Fixturing selection
2. Securing weldments
3. Fixturing for maximum robot productivity

V. Assignments

A. Appropriate readings

Textbook Reading-Students will be expected to complete all assigned chapter reading assignments.

B. Online lab assignments

Complete: ArcTool Operations and Programming (eight modules)

C. Writing assignments

None

D. Out of class assignments

Homework – end of chapter review questions from the student manual.

VI. Methods of Evaluation

Methods of evaluation will be based on the following:

- A. Lab Assignments
- B. Homework assignments (Chapter review questions)
- C. Tests/quizzes
- D. Certified ArcTool Training test (online). A score of 805 or higher is required to pass.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery

Correspondence Delivery

Hybrid Delivery

Online Delivery

Traditional Delivery

Traditional classroom delivery will be used for all required lecture hours. In addition, students will be expected to complete “ArcTool Operations and Programming” using FANUC’s online eLearn during lab hours.

VIII. Representative Texts and Supplies

Text:

Fanuc Robotics - ArcTool Operations and Programming Student Manual

Note: Available from Lassen College book store only

IX. Discipline/s Assignment

Welding Technology

X. Course Status

Current Status: Pending Approval

Course Originator: Kory Konkol

Original Approval Date: 09/20/2016

Board Approval Date: 10/11/2016

Chancellor’s Office Approval Date: 02/13/2019

Revised By:

Latest Curriculum/Academic Standards Committee Revision Date: 02/15/2022