



ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Workforce Development (WFD)

COURSE: RMA 2210 Robotics II

Effective Date: Spring 2025

Submitted Date: Aug-24

Credit Hours: 2

IAI Number (if applicable): N/A

Complete all that apply or mark "None" where appropriate:

Prerequisite(s): RMA 1210

Enrollment by assessment or other measure? Yes No

If yes, please describe:

Corequisite(s): None.

Pre- or Corequisite(s): None.

Consent of Instructor: Yes No

Delivery Method: <input checked="" type="checkbox"/> Lecture	1 Contact Hours (1 contact = 1 credit hour)
<input type="checkbox"/> Seminar	0 Contact Hours (1 contact = 1 credit hour)
<input checked="" type="checkbox"/> Lab	2 Contact Hours (2-3 contact = 1 credit hour)
<input type="checkbox"/> Clinical	0 Contact Hours (3 contact = 1 credit hour)
<input type="checkbox"/> Practicum	0 Contact Hours (2-4 contact = 1 credit hour)
<input type="checkbox"/> Internship	0 Contact Hours (5-10 contact = 1 credit hour)

Offered: Fall Spring Summer

CATALOG DESCRIPTION:

This is the second of a two-course sequence that covers advanced robotic programming using teach pendants, explores multiple robot integration, and digitally interfaces robots with other automation components, such as programmable logic controllers, computer-controlled machines, and conveyors. This course will review the hardware aspects, including robot configurations, drive mechanisms, power systems (hydraulic, pneumatic, and servo actuators), end-effectors and end-of-arm-tooling, sensors, control systems, machine vision, programming, safety, and integration. The software aspect deals with the various textual and lead-through programming methods commonly found on commercial robotic systems and simulation systems offered by robot manufacturers. Digital interfacing of robots with other automation components, such as programmable logic controllers, computer-controlled machines, and conveyors, is introduced.

ACCREDITATION STATEMENTS AND COURSE NOTES:

None.

COURSE TOPICS AND CONTENT REQUIREMENTS:

- I. Industrial and Faculty Business Systems
- II. Machine System and Design
- III. Applications

INSTRUCTIONAL METHODS:

- Lecture
- Discussion
- Demonstration

EVALUATION OF STUDENT ACHIEVEMENT:

- Quizzes
- Tests
- Labs
- Projects

INSTRUCTIONAL MATERIALS:

Textbooks

Programming Fanuc Robots for Industrial Applications 1st edition, ISBN: 978-0-8269-3412-3

Resources

Festo (LMS) (Lab trainer)

Amatrol (LMS) (Lab trainer)

LEARNING OUTCOMES AND GOALS:

Institutional Learning Outcomes

- 1) Communication – to communicate effectively.
- 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical reasoning to formulate a judgement or conclusion.
- 3) Social Consciousness – to understand what it means to be a socially conscious person, locally and globally.
- 4) Responsibility – to recognize how personal choices affect self and society.

Course Outcomes and Competencies

Upon Completion of this course, the student will be able to:

1. List the four general categories of robotic manipulation
 - 1.1. Define manipulation types
 - 1.2. Define application awareness (practical application) used in industries
 - 1.3. Show technical proficiency and program the robot to perform tasks within the manipulation category

2. List six end effectors used in industrial robotics.
 - 2.1. Define and show knowledge of Grippers
 - 2.2. Define and show knowledge of Welding torches
 - 2.3. Define and show knowledge of Suction cups
 - 2.4. Define and show knowledge of Magnetic grippers
 - 2.5. Define and show knowledge of Tooling End Effector
 - 2.6. Define and show knowledge of Sensor End Effector

3. Identify five types of motion instructions
 - 3.1. Understanding motion types defines PTP, CP, Liner, Circular, and Joint types.
 - 3.2. Demonstrate basic programming skills utilizing the motions
 - 3.3. Simulate and test the program

4. Define major axes and minor axes
 - 4.1. Explain Robot Kinematics and its purpose in robotics
 - 4.2. Identification of Major Axis
 - 4.3. Identify Minor Axis
 - 4.4. Explain the Coordinate System
 - 4.5. Demonstrate mechanical and electrical knowledge by troubleshooting errors