



BAKER COLLEGE

STUDENT LEARNING OUTCOMES

MATT1610 Introduction to Robotics
3 Semester Credit Hours

Student Learning Outcomes and Enabling Objectives

1. Identify industrial robots used in a variety of applications.
 - a. Classify robots by drive systems, joints, degrees of freedom, and applications.
 - b. Describe components of robots: power supply, motors, controller, sensors, and end-effectors.
 - c. Describe coordinate systems: global, user, tool.
2. Explain robotic programming techniques.
 - a. Compare options for robotic programming: textual languages, pendant training.
 - b. Describe point locations, including tolerances and motion control.
 - c. Describe techniques of making decisions, looping, counting, and calculating.
3. Compare various types of sensors used in robotics.
 - a. Describe general theory of transducers: physical property to voltage or resistance.
 - b. Explain operation of sensors including light, image, sound, temperature, proximity, motion, and acceleration sensors.
4. Identify various types of end-of-arm tooling.
 - a. Describe end-of-arm tooling for e.g. gripping, painting, cutting, welding.
 - b. Distinguish between prehensile and non-prehensile movements.
5. Analyze movement systems in industrial robots.
 - a. Analyze electric servo drive systems.
 - b. Analyze fluid drive systems: hydraulic and pneumatic.
6. Characterize various robotic applications.
 - a. Characterize robot systems suitable for material handling, painting, food prep, human contact.
 - b. Characterize sensing and tooling systems appropriate for sorting, cutting, welding, painting.
 - c. Characterize input / output signals required for different applications: digital, serial, parallel.
7. Apply safety procedures in a lab environment.
 - a. Practice safety procedures for personnel and operators.
 - b. Configure technical safety features of the robot: modes, safety locks, sensors, robotic 'fence'.
8. Operate a robot automatically using software routines.
 - a. Manage robot motion with manual jogging operations.
 - b. Capture point locations with the teaching pendant.
 - c. Produce compound movements with software routines.
 - d. Store and edit programs to repeat later.

- e. Handle error and fault conditions.
 - 9. Demonstrate complex robotic procedures to fulfill required tasks
 - a. Create original programming for the required task.
 - b. Present robot demonstration to an audience.
-

These SLOs are not approved for experiential credit.

Effective: Fall 2022