Course Information Form (CIF)

Course Code: ELT 299

Course Title: Robotics and Automation

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 15.9995
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 2-2-3
Credit Hour Distribution:

Lecture: 2	Lab: 2	Clinical: 0	**Total: 3**

General Course Information

Catalog Description

Robotics fundamentals: capabilities and applications, mechanical and electrical requirements, operation, and programming. Automation techniques and devices, controls and feedback mechanisms, servo motors and motion control.

General Course Objectives

Students will be able to describe Robotics fundamentals, capabilities, and applications; install and configure robot trainer; and operate and program the robot to perform specific tasks. Students will work in teams to create a project to be demonstrated at the end of the course.

Minimum Placement Levels

English	Reading	Math
None	None	None

Prerequisites

Sophomore standing

Methods of Evaluation

Minimum of 6 quizzes, 4 labs, 1 midterm exam, 1 final exam, and 1 project.

Instructional Materials and Additional Supplies

Programming FANUC Robots for Industry Applications, 1st Ed. Grunke, James W. ISBN# 97808269341123
Safety glasses

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Introduction to Robotics; Features and Applications	1. Describe different robot types, features, benefits, applications, and programming languages.	2	0	0
Robot Components; Installation and Configuration of Robot	1. Describe function of robot components and block diagram operation of system. 2. Install and configure robot with computer.	2	2	0
Operator Interface Controls	1. Describe operator interface control, operational modes, and start-up, emergency, and shutdown procedures. 2. Demonstrate manual operation of robot.	2	2	0
Robot Instruction Set and Programming Language	1. List start-up requirements and operating system commands. 2. Describe instruction and programming method. 3. Run demonstration programs.	4	4	0
Servo Control Systems	1. Describe servo control, feedback systems, and stability. 2. Demonstrate stable and unstable control.	2	2	0
Robot Servomotors and Input/output (I/O)	1. Describe robot servomotor and I/O capabilities and interface requirements. 2. Test servomotors and I/O with program.	2	2	0
Actuators	1. Describe electrical, pneumatic, and electro-hydraulic methods of controlled motion. 2. Connect and demonstrate different actuators.	2	2	0
Sensors	1. Describe sensors used in robotics: proximity, force and torque, linear and angular measurement, and transducers used. 2. Connect and demonstrate transducers measurement.	4	4	0
Programming Techniques	1. Describe program control of robotic movements. 2. Program robot to perform specific tasks.	2	4	0
Mechanical Systems	1. Describe objects, position, and time in three dimensions, work holding devices, grippers, transporters, and drive position and holding systems. 2. Demonstrate moving objects.	4	4	0
Robot Operating Software and Communications	1. Describe requirements of operating software, host computer, and communications port. 2. Document communication port configuration.	2	2	0
Project Documentation and Presentation	1. Document project, mechanical, electrical, program, and performance issues. 2. Demonstrate final project.	2	2	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	30	0