ELEC 184 Course Outline as of Fall 2024

CATALOG INFORMATION

Dept and Nbr: ELEC 184 Title: INDUSTRIAL ROBOTICS Full Title: Industrial Robotics Fundamentals Last Reviewed: 5/8/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.50	17.5	Lecture Scheduled	43.75
Minimum	3.00	Lab Scheduled	1.50	8	Lab Scheduled	26.25
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 87.50

Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:

In this course students will receive an introduction to the control of autonomous industrial robots. Students will learn the fundamentals of basic robotics and learn how to control the Fanuc LR-Mate 200id robotic arm using a teach pendant and 3D control software.

Prerequisites/Corequisites:

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:

Description: In this course students will receive an introduction to the control of autonomous industrial robots. Students will learn the fundamentals of basic robotics and learn how to control the Fanuc LR-Mate 200id robotic arm using a teach pendant and 3D control software. (Grade Only)
Prerequisites/Corequisites:
Recommended:

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree: CSU GE:	Area Transfer Area	Effective: Effective:	Inactive: Inactive:
IGETC:	Transfer Area	Effective:	Inactive:
CSU Transfer	: Effective:	Inactive:	
UC Transfer:	Effective:	Inactive:	

CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

- 1. Demonstrate safety procedures when operating robots.
- 2. Program a set of movements on the teach pendant.
- 3. Simulate robot movement in simulation software.

Objectives:

At the conclusion of this course, the student should be able to:

- 1. Operate a robot in joint and world modes in real time.
- 2. Create and change teach pendant programs.
- 3. Modify a program.
- 4. Abort, access, test, and run programs.
- 5. Add an end-of-arm tool.
- 6. Operate a robot in simulation software.

Topics and Scope:

- I. Robot System
 - A. Major/minor axes
 - B. Joints and links
- II. Robot Operations
 - A. Safety
 - 1. Programming safety precautions
 - 2. Mechanical safety precautions
 - B. Teach pendant
 - 1. Function menu
 - 2. Status indicators
 - 3. Moving a robot in joint and world modes
 - 4. Create and change teach pendant programs

5. Abort, access, test, and run programs

III. Handling Tool Operation and Programming

A. Frames

1. Cartesian coordinate system

2. World, tool, user, and jog frames

- B. Input/Output (I/O)
 - 1. I/O signals
 - 2. Configure I/O
 - 3. Controller I/O
- C. Program instruction
 - 1. Motion programs
 - 2. Motion instructions
- D. Modify a program
- E. Macro commands
- F. Robot setup for production
- G. File management

IV. Roboguide-HandlingPRO

- A. Move a robot in 3D
- B. Adjust the display
- C. View multiple windows
- D. Edit robot properties
- E. Add a part and define the part in a cell
- F. Add an end-of-arm tooling
- G. Defining a relationship between tool and part
- H. Create two fixtures for pick and placement
- I. Create and run a program
- J. Create an animated AVI file of the workcell
- K. Calibrating the virtual workcell to the real cell
- L. Add another robot to the workcell
- M. Set the I/O to avoid robot collision

All items in the topics and scope are covered in the lecture and lab portions of the course.

Assignment:

Lecture-Related Assignments:

- 1. Reading (10-30 pages per week)
- 2. Homework assignments (4-8)
- 3. Quizzes (2-6)
- 4. Final exam

Lab-Related Assignments:

- 1. Laboratory assignments including demonstration of robot operation (5-12)
- 2. Program documentation (4-8)

Representative Laboratory Assignments:

- 1. Moving a robot in joint and world modes
- 2. Create and change teach pendant programs
- 3. Abort, access, test, and run programs
- 4. Use teach pendant to draw a circle
- 5. Use teach pendant to write a name
- 6. Operate a robot in 3D simulation software

- 7. Add a part and define the part in a cell
- 8. Create an AVI file of the 3D workcell

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Program documentation

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework assignments

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Laboratory assignments including demonstration of robot operation

Exams: All forms of formal testing, other than skill performance exams.

Quizzes; final exam

Other: Includes any assessment tools that do not logically fit into the above categories.

None

Representative Textbooks and Materials:

Instructor prepared materials

Problem solving 20 - 30%
Skill Demonstrations 10 - 30%

Writing

20 - 50%

Exams 20 - 40%

Other Category 0 - 0%