

ISE 324 Industrial Automation & Robotics

Spring 2020

Instructor

Dr. Derya Pamukcu

dp00@lehigh.edu

Office: Mohler Lab Room 325 Ext. 85868

Office Hours: 2-3 pm Tuesday, Thursday, or by Appointment

Class times: 3:00-4:15pm Mondays and Wednesdays, Rm: MO 451

Course Website: Course materials, assignments and your grades will be posted on "Course Site". You are responsible for keeping track of your grades and general progress in the course, so please visit the site regularly. All due dates for homework and projects, as well as changes to the assignments will be posted on the course site.

Catalog Course Description:

Introduction to robotics technology and applications. Topics include robot anatomy, controls, sensors, programming, work cell design and various applications of robots in an industrial setting. Laboratory exercises.

Upon completion of this course students will:

- Know the anatomy and terms associated with industrial robots and various applications for robots in manufacturing and other industries.
- Know the component of robotic systems including controllers, sensors, grippers and tools that can be used with a robot
- Have a basic understanding of the kinematics of a robot and its interaction with the environment
- Have an understanding of vision systems and their use in industrial applications
- Have an understanding of controllers for industrial automation
- Learn basic use and operation of PLC's and ladder logic
- Understand basic sensors and their usage in automation.

Course Philosophy: Industrial automation and Robotics are both keywords that cover a wide area of applications, and areas of expertise. This course is intended to introduce you to some, and make you aware of the many of those areas. We'll look at robotics from the viewpoint of Industrial Automation and learn the fundamentals- the anatomy, terminology, and basic calculations for positioning and dynamics.

We shall also investigate closely related topics that are hot today - sensors, controllers, Mechatronics, and investigate their impact on the automation of today.

This will be more of a journey and investigation, than a lecture in what was... so stay tuned and enjoy.

This class is 3 credit hours - We'll end up approximately 1 lab session per 2 lectures. We shall start with lectures the first two weeks, and I shall let you know when the lab sessions are, and you'll get a chance to do some work to reinforce the topics we studied. You'll get a chance to work on something you are interested in by the 3rd quarter of this class, when we'll spend more time in the lab rather than the lecture.

Text:No textbook has been assigned to this course - You will be provided information from multiple sources as needed.

Academic Honesty: Integrity and Honesty are vital in life, especially for engineers, since the systems we design or modify can improve people's quality of life, or can do irreparable harm. Using probability and statistics ethically requires that we state all of the facts and assumptions in as clear a manner as possible, to avoid "lying with statistics". We are also bound by honor to give credit where it is due. On quizzes and exams your work should be entirely your own. Violations of academic honesty will result in disciplinary proceedings.

Here is the statement of the Lehigh Student Senate on academic integrity from <http://www.lehigh.edu/~indost/conduct/aistatements.shtml>: "We, the Lehigh University Student Senate, as the standing representative body of all undergraduates, reaffirm the duty and obligation of students to meet and uphold the highest principles and values of personal, moral and ethical conduct. As partners in our educational community, both students and faculty share the responsibility for promoting and helping ensure an environment of academic integrity. As such, each student is expected to complete all academic course work in accordance to the standards set forth by the faculty and in compliance with the University's Code of Conduct."

Homework: You will have regular homework assignments for most weeks. Homework assignments must be turned in during the class on the assignment due date. No credit will be given to the assignments turned in late.

In this class, you might ask others for help with a homework assignment. Once you write up your answer in your own words to turn in, it must be your own work. Naturally, Academic Honesty applies to your homework assignments too.

Class Preparation and Participation: You are expected to come to class regularly and to be prepared for each class by reading any assigned work ahead of time. I will post notes on *Course*

Site in advance so that you may bring them to class if you wish. In addition, you are expected to participate in class discussions and ask questions. A portion of your grade will be based on class participation.

Extended Absences and Missing HWs & Exams: If you believe you will miss two or more consecutive lectures due to illness, holidays, family emergencies, etc., please contact me as early as possible so that we can develop a plan for you to make up the missed material. You cannot receive credit for missed homework or exams unless you have discussed your absence with me in advance or in some cases a written excuse from a doctor or the Dean of Students.

Recording Devices and Cell Phones in the classroom: Any use of personal devices including cellphones, mp3 players etc. is strictly forbidden. If you have to use personal laptops for note-taking, Care must be taken not to distract your fellow students.

Grading: Tentatively, your grade will be calculated as follows:

Note that these may change based on the number of assignments of each category, and changes will be announced and/or posted.

Homework assignments	15%
Tests (2)	40%
Project(s)	15%
Labs	20%
Class Participation	10%

Homework assignments will be given for most weeks.

Projects will be assigned - will vary in depth and complexity, proper time allotment will be made.

Accommodations for Students with Disabilities: If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, University Center C212 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

Principles of Equitable Community

Lehigh University endorses The Principles of our Equitable Community

(<http://www4.lehigh.edu/diversity/principles>). We expect each member of this class to

acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

Other Relevant University Policies

Religious Holidays <http://www.lehigh.edu/~incha/holidays.html>

Lehigh Computer Usage <http://www.lehigh.edu/security/computepolicy.html>

Academic Integrity <http://www.lehigh.edu/~infkli/AcademicIntegrity.htm>