CPE526 ROBOTICS AND AUTOMATION

Robots

Robots are programmable machines which are able to carry out a series of actions autonomously, or semi-autonomously. They interact with the physical world via sensors and actuators.

Robotics

Robotics is a branch of engineering that deal with design, construction and application of robots.

Automation

Automation means using computer software, machines or other technology to carry out a task which would otherwise be done by a human worker.

Note: Some robots are autonomous but are not used in automation. For example, a toy line-following robot can autonomously follow a line painted on the ground. However, it is not automation because it isn't performing a specific task. If instead the line-following robot were transporting medicines around a hospital, then it would be automation.

Automation and Robotics Engineering: is the use of control systems and information technologies to reduce the need for humans in the production of goods and services.

Purpose: The purpose of this course is to introduce you to basics of modeling, design, planning and control of robot systems.

Book: Introduction to Robotics: Mechanics and Control, John J. Craig, 3rd Edition.

Attendance: A mandatory 70% attendance is required.

Grading: The final grade will be a weighted average of:

- Homework 10%
- Midterm 10%
- Project 10%
- Final 70%

There will be one homework which will be due 7 days later. The midterm will be open book. Students will design and implement control of a robotic arm manipulator in a group-based term project. Lectures will follow roughly the same sequence as the material presented in the book, so it can be read in anticipation of the lectures. However, focus will be on the following:

- Spatial descriptions and transformations
- Manipulator kinematics
- Manipulator dynamics
- Trajectory generation
- Linear control of manipulators
- Robot programming languages and systems