ECE/ME 3163: Robot Control and Dynamics

Instructor:
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Class Meetings: Days - TDB, Time - TBD

Textbook:
Robot Modeling and Control by M. Spong, S. Hutchinson, M. Vidyasagar, John Wiley and Sons, 2006.

Course Overview and Details:
The course will cover basic concepts and topics related to robot control and dynamics. Topics will include:

1. Review of basic control concepts
2. Robot joint modeling
3. Robot joint control including P/PI/PID, state space design
4. Robot dynamics using Euler-Lagrange formulation
5. Robot manipulator control using dynamics
6. Robot manipulator joint and task space control using inverse dynamics
7. Robot control loop with trajectory planner
8. Robust and adaptive control design for robot manipulators
9. Robot control using visual feedback (Vision-based control)

Prerequisite: ECE 3161 and ECE 3111 or ME 3253
Required, elective, or selected elective: Required

Specific Outcomes of the Course: This course will introduce students to the basic concepts of robot manipulator modeling and control. Concepts include joint space and task space control, Euler-Lagrange dynamics, independent joint control, whole robot manipulator control, robot control using visual feedback, robot control with trajectory planner. The students will get practice of robot controller implementation aspects via a course project and practical examples throughout the course.

Project: A group course project is mandatory. The students will apply the concepts learnt in the class to a real robot manipulator control.

Grading Criteria:

Homeworks	20%
Midterm Exam	20%
Final Exam	30%
Project	30%
Total	100%