Syllabus

EEL6667: Kinematics, Dynamics and Control of Robot Manipulators (Fall 2003)

Instructor: Michael C. Nechyba
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TA: TBD
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Class web page: http://mil.ufl.edu/~nechyba/eel6667
Class meeting: T: 8th & 9th; Th: 8th, LAR 330.

Required textbook: John J. Craig, *Introduction to Robotics: Mechanics and Control*, *2nd ed.*, Addison-Wesley, Reading, MA, 1989. (ISBN 0-201-09528-9). Additional readings, including lecture notes, slides and selected papers from the literature will be posted periodically on the class web site.

Prerequisites:

- Differential equations
- Calculus
- Basic linear algebra
- Basic physics.
- Previous programming experience (e.g. C/C++, MATLAB, Mathematica, etc.)

Course objectives:

In this course we will cover topics related to the kinematics, dynamics and control of robot manipulators. This will involve, among other things, the following subtopics:

- Rigid body motion.
- Robot manipulator coordinate frames.
- Homogeneous matrices and frames.
- Forward and inverse position and velocity kinematic solutions for robot manipulators.
- Jacobians and manipulability.
- Newton-Euler and Lagrangian dynamics.
- Robot control.
- Selected topics in robot planning (as time permits).

Grading:

- 30%: Midterm (date/format TBA)
- 50%: Homeworks
- 20%: Final project/class presentation

Class e-mail:

Many class announcements, clarifications and answers to student questions will be distributed primarily via e-mail. To get on the class e-mail list, you should send an e-mail to <nechyba@mil.ufl.edu> with the *subject* of the e-mail being **EEL6667**; be sure to include your full name in the body of the e-mail.

Mathematical software:

Some homeworks and the final project will require the use of a mathematical software package, such as Mathematica, MATLAB, MathCad and Maple, all available at student prices; which software package you choose is entirely up to you. Having said that, however, Mathematica will be used almost exclusively for in-class demonstrations and examples, as it is the most sophisticated general purpose mathematical software package available, allowing text, equations, graphics, numerical and symbolic mathematics to be seamlessly integrated into notebooks. These notebooks will be distributed on-line, and can be viewed with free software (MathReader) available from Wolfram, Inc., the developer of Mathematica. To modify and experiment with the Mathematica notebooks, however, will require that you have access to a copy of Mathematica.

Academic honesty:

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action.

This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.