Syllabus
MEEG 671 – Introduction to Robotics

COURSE INFORMATION

Lecture:

TuTh 12:30–1:45, Gore 218

Instructor: Bert Tanner

Office:	SPL 228
Phone:	831-6888
Email:	btanner@udel.edu
Office Hours:	Wednesdays 10:00—12:00

Text: *Robot Modeling and Control*, by M. W. Spong, S. Hutchinson, and M. Vidyasagar. Wiley 2006.

Description: This is an introductory course in robotics for senior undergraduate and junior graduate students who have had little to no other introductory courses on the topic. The course focuses on topics in robotics that relate to modeling, dynamics, and control of robotic manipulators. Mathematical preliminaries include matrix and vector analysis, basic kinematics and kinetics, and classical (frequency-based) control theory. Some background on more advanced topics such as Lagrangian dynamics, and modern linear and non-linear dynamical system analysis definitely help.

Most, if not all, course-related communication and material sharing, including class note handouts and occasional videos, will be done through Sakai.

Material to be Covered: Very fast review of 3D kinematics; representation of kinematic chains, Denatit-Hartenberg frame assignment convention; forward and inverse kinematics; Jacobians, static force/torque relationships, and maneuverability; Independent joint control; Path and trajectory planning, and dynamics (time permuting).

Evaluation methods:

HOMEWORK (20%) is assigned on a weekly basis. Assignments are due one week after they are out, and are supposed to be submitted at *before* the lecture begins. Late homework is accepted at the expense of a 20% penalty for each additional day. Homework problems are selected from the textbook for the most part, with the intention to put in practice the material presented during the lecture. The undergraduate and the graduate portions of the class may receive slightly different assignments.

CLASS PARTICIPATION (10%) consists of in-class quizzes, general attendance of lectures, and completion of the student evaluation survey at the end of the course.

MIDTERM EXAM (30%) which is to be scheduled close to (shortly before of after) the spring break. Exact date to be determined. It will be an in-class, open-book but closed notes exam. Students bring their own paper and calculators.

FINAL EXAM (40%) which is scheduled at the time and date specified by the University. No modifications on the time or date of the final exam can be made. Students bring their own paper and calculator.

Grades The rubric for partial grade for each component of assignments and exams is as follows:

Response assessment	credit
Correct response, clearly written and justified	1.00
Only grade-level derivation errors	0.75
Knows process but has trouble executing	0.50
Has some understanding of the thought process	0.25
Clueless	0.00

Grade calculation is (strongly) curved aimed at encouraging participation and effort. The exact curving formula for a numerical grade between 0 and 100 (rounded up to the nearest integer) is as follows:

$$\mathsf{grade} = 10 + 100 \times [1 - \exp(-2.3 \times \mathsf{credit})] \ .$$

It is always preferable to submit something than nothing at all, although the importance of thoughtful and complete presentation of any results is important. The instructor will not assume the correct answer on behalf of the student if this answer is incomplete or vague.

The mapping between numerical grades and the A – F scale is as follows.

A	96–100	A-	92–95	B+	88–91	B	84–87
B-	80–83	C+	76–79	C	72–75	C-	68–71
D+	64–67	D	60–63	D-	56–59	F	0–55

Further reading:

- Sciavicco and Siciliano, *Modeling and Control of Robot Manipulators*, McGraw-Hill
- Craig, *Introduction to Robotics*, Pearson Prentice Hall.

POLICIES

Working Together: Collaboration is accepted on homework, but solutions should be given based on individual justification and reasoning, which needs to be clear on your paper. Collaboration on exams is of course is forbidden.

Absences: You are expected to attend every class. It is not acceptable to give priority to assignment completion over class attendance. The 20% penalty on assignments thus applies also to the case where you choose to miss class in order to finish your assignment.

Plagiarism: Definition: http://www.udel.edu/stuguide/06-07/code.html#honesty
In this context, students are expected to present their own interpretation of other people's ideas and work. Summarizing and paraphrasing without proper citation and documentation[1] is unacceptable. The same applies to copying assignment solutions from manuals available online. The University's *minimum penalty* for cheating or plagiarism is *a failure in the course*. For the first time the transgression is noted, the assignment will not receive a grade. Repeated offenses may result to dismissal from the University.

[1] *Defining and Avoiding Plagiarism: The WPA Statement on Best Practices*, 2003. Online: http://www.ilstu.edu/ ddhesse/wpa/positions/WPAplagiarism.pdf . Accessed August 29, 2006

Intellectual Property: No student may distribute notes, audio-visual or other material from the class, whether or not for a fee. If any UD student, whether enrolled in the class or not, distributes such material in contradiction of this prohibition, (s)he will be in violation of the Student Code of Conduct.

Disclosures of Instances of Sexual Misconduct If, at any time during this course, I happen to be made aware that a student may have been the victim of sexual misconduct (including sexual harassment, sexual violence, domestic/dating violence, or stalking), I am obligated by federal law to inform the university?s Title IX Coordinator. The university needs to know information about such incidents to, not only offer resources, but to ensure a safe campus environment. The Title IX Coordinator will decide if the incident should be examined further. If such a situation is disclosed to me in class, in a paper assignment, or in office hours, I promise to protect your privacy—I will not disclose the incident to anyone but the Title IX Coordinator. For more information on Sexual Misconduct policies, where to get help, and reporting information please refer to www.udel.edu/sexualmisconduct. At UD, we provide 24 hour crisis assistance and victim advocacy and counseling. Contact 302-831-2226, Student Health Services, to get in touch with a sexual offense support advocate.