ME 115(a,b): Introduction to Kinematics and Robotics

Lecturer: Prof. Joel Burdick, Thomas 319, x4139, jwb@robotics.caltech.edu

T.A.: TBD
T.A. office hours: TBD

Location: 206 Thomas
Time: Tuesday/Thursday 9-10:30 am (tentatively)

Scope and format of ME 115

Theoretical Kinematics is the study of motion, while *Applied Kinematics* is the analysis and synthesis of mechanisms which implement given motions. This course will attempt to present basic material in both theoretical and applied kinematics. The heuristic goals of this course are to:

- introduce some of the basic problems in kinematic analysis.
- give an introduction to those areas of robotics which rely upon kinematics.
- Introduce sufficient kinematic terminology so that interested students can read the kinematics and robots research literature.

The first quarter of the course largely reviews the fundamentals of kinematics at a methodical pace. The second quarter is largely devoted to applications of the theory to robot manipulator arms and multi-fingered robotic grasping.

Course Prerequisites

The course assumes some basic knowledge in linear algebra (such as eigenvalues and eigenvectors). Most other mathematical concepts will be reviewed or introduced as needed. Students who have completed Math 2 or the equivalent have adequate preparation.

Course Mechanics and Grading

The course-work will consist entirely of homework and a take-home final exam. A small project, approved by me, can be substituted for the final exam. The course grade will be computed as follows:

Homework (approximately 5-6 sets)	70%
Final Exam (or project)	30%

The homework is not intended to be difficult, but rather to reinforce the topics presented in the lectures.

Course Web Site: The web site for this course can be found at:

http://robotics.caltech.edu/~jwb/courses/ME115/ME115.html

This site will contain copies of homework assignments, homework solutions, and most class handouts. Important information about the class, such as changes in due dates, homework errata, etc. can be found on the "Bulletins" page. You should visit this site if you miss class, as we will not accept any excuses for being uninformed.

References

The main text for this course is: A Mathematical Introduction to Robotics by Murray, Li, and Sastry. There is a second edition with some of the errata from the first edition corrected. Either edition is fine for the course. Material not found in this book will be distributed in class.