CMPE 293: Introduction to Feedback Control System Design
General Information and Syllabus

Spring 2004
T-Th 2:00-3:45 PM
Class: Porter College Room 241

Instructor: Gabriel Hugh Elkaim
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Office: Baskin Engineering, 353B
Hours: T-Th 4:00-5:30 PM
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        (415) 377-5723 (Cell: 10AM to 9PM please)

TAs and Tutors: TBD.

Required Textbooks (in the library on reserve):


Prerequisites: EE103 or equivalent (Differential Equations, Circuits, Physics)

Homework: 1 set per week, due in my office, Thursday at 5 PM.

Website: www.soe.ucsc.edu/classes/cmpe293/Winter04
Check this site often as this is where the homework assignments, lecture notes, homework and test solutions, and lecture videos are posted. You are expected to read the material on the website.

**Videos:** As an experiment in teaching technology, the instructor will be capturing both the audio and screen from the course in real-time. This will later be posted to the website. While every attempt will be made to capture the classes, as this is a new technology, there are no guarantees. Also, while watching the video should be a great way to review course material, if you are not in class you cannot ask questions and/or clarifications. Further, if too few students show up for lectures, the instructor may restrict access to class videos.

**Blog:** [www.robotica-exotica.com](http://www.robotica-exotica.com)

This is the professor’s personal blog, having to do with robotics, control systems, and just technology in general. This is just given as a reference.

**Syllabus:**

Chapter 1: Intro and History  
Chapter 2: Dynamic Models  
Chapter 3: Dynamic Response  
  - Convolution  
  - Laplace Transforms  
  - Block Diagrams  
  - Control Specifications  
Chapter 4: Basic Properties of Feedback  
Chapter 5: Root Locus Design  
Chapter 6: Frequency Response Design  
  - Frequency Response  
  - Nyquist  
  - Bode  
  - Compensation  
Chapter 7: State-Space Design

**Grading:** the course grade is the weighted average of the following criteria:

- Homeworks 20%  
- Midterm 30% 04-May-2004  
- Final Exam 50% 09-June-2004, 8 – 11 AM

If you have any disability-related needs, be sure to contact the Disability Resource Center well in advance of any expected need.

**MATLAB:** this course will rely heavily on the use of MATLAB for homework, and as a tool to understanding control system behavior. MATLAB is available on the cluster computers in Baskin Engineering, as well as on the Solaris machines. You can also
purchase a copy of the student version of MATLAB directly from the Mathworks (and also from the bookstore). The control system toolbox is also available from the Mathworks.

**Academic Honesty**

Academic honesty is a requirement for the course. All assignments must be your own independent work; this includes homework and exams.

What is cheating? It is presenting work that is not yours as your own. Using unauthorized reference materials, reproducing the solution off of an old homework are all unacceptable. You can, and are encouraged to, discuss and strategize with your colleagues on homeworks, but your work should be your own. Copying is NEVER acceptable.

If a student is caught cheating in this class this will result in an immediate failure in the class. It will be reported to your college and your department. DO NOT CHEAT; it is not worth it.

**Acknowledgements**

I would like to acknowledge the help of Prof. Ed Carryer of Stanford University in pioneering this video capture technology, and helping me to set this up. I would also like to thank Prof. Steve Rock of Stanford University for the course material, syllabus, and general inspiration and help in setting up this class.