

Syllabus

Winter 2009

Course Information

Instructor:	Eric Klavins (klavins@u)
Teaching Assistants:	Steve Safarik (ssafarik@u.washington.edu)
Lecture:	MWF, 12:30-1:20, MEB 246
Laboratory:	233 Sieg Hall, Flexible Schedule
Reference Text:	<i>Control Systems Engineering</i> by Nise or <i>Feedback Systems</i> by Astrom and Murray
Web Page:	http://soslab.ee.washington.edu/mw/index.php/EE448.Winter.2009

Course Objectives

The goal of this course is for you to use SISO techniques to control real systems. You will learn to use a computer and an I/O card to control the dynamics of electromechanical devices. This will involve: implementing a continuous controller on a computer, characterizing sensors and actuators, modeling and finding parameters of real systems and implementing feedback controllers with analog electronics.

Course Structure

The course consists of weekly laboratory modules. After the first lecture meeting (on Jan. 5), we will meet in the lecture room every Monday at 12:30-1:20 to introduce that week's module. (When Monday is a holiday, we will meet the Friday before that). You and your partner will then have one week to complete the module and write up your results, which should take 3-5 hours. The equipment needed to do the work will be available in Sieg Hall Room 233.

Laboratory Schedule

The laboratory in Sieg 233 can accommodate up to four teams simultaneously. Thus your team may schedule three hours of *priority time* in the lab. If you decide to work in the lab at some other (additional) time, you may have to relinquish your lab station to a group that has reserved it. The priority schedule will be maintained on the course wiki.

The TAs and the instructor will hold office hours in Sieg 233 to answer questions, debug hardware and help you with your assignments. See the course web page for the schedule.

Teams and Grading

Each team will have two students. The work done by each student for each module should be approximately equal. Students must alternate being the “lead author” for the report. The responsibilities of the lead author are to (1) collect the data; (2) collect text and figures; (3) produce the final copy of the report. The lead author is not supposed to write the entire module her/himself. Instead, the lead-author should “produce” the writeup, like a producer produces a movie.

Grading in the course is based on the nine module reports. Each report will be graded on a scale of 0-10 based on correctness, completeness and neatness (see below). In addition, students must note what percentage of the work for that module was done by each student. Your final grade will be based on these scores, the percentage work you did for each. The reports for which you are the lead author will count double.

PLEASE HAVE YOUR TEAM ORGANIZED BY FRIDAY 1/9 AND EMAIL STEVE SAFARK WITH YOUR TEAM NAMES.

Lab Report Guidelines

Your team will turn in reports of your laboratory work each week, in class on Mondays. We will supply you with a description of the module, which has the module objectives and a list of activities and suggestions for your reports. You should do the activities and then explain relevant steps, calculations, data, etc. and interpret the results for your report. Your report must address the objectives of the module, but may deviate from the suggested activities however you see fit.

Your report must use complete sentences, grammar and spelling. Your figures and tables should be labeled and captioned. You should include the following:

1. Title, authors (and an indication of who is the lead author), group number, percentage of work done by each member.
2. A brief abstract stating the objectives *and* the main results.
3. An introduction providing the background and goals of the module.
4. A discussion of the relevant theory.
5. All significant calculations.
6. Representative results (in figures, tables, etc).
7. A discussion of the results and a conclusion.

8. A list of references (if any).

REPORTS ARE LIMITED TO 10 PAGES IN LENGTH (FEWER IS OKAY TOO).
YOU MAY NOT COLLABORATE WITH OTHER TEAMS TO PREPARE YOUR
REPORT.

Late report policy: If your report is turned in late, your grade will be reduced by 1/2
of the computed grade. Late reports will be accepted up to one week late. After one
week, they will not be accepted.

Schedule

The following is an approximate schedule. It is subject to change.

Week	Lecture Date	Topic
0	1/5	Course Introduction and Organization
1	1/12	I/O
2	1/16	Modeling the Temperature Board (1/19 is MLK Day)
3	1/26	Control of the Temperature Board
4	2/2	Sensitivity and Disturbances with the Temperature Board
5	2/9	Analog Control of the Pendulum
6	2/16	Modeling the Pendulum I
7	2/23	Modeling the Pendulum II
8	3/2	Position Control of one Link
9	3/9	Balance Control of the Second Link