UNIVERSITY OF UTAH
Department of Electrical and Computer Engineering
ECE 3510 Introduction to Feedback Systems
Syllabus

Prerequisite: ECE 3500

Lecturer: Professor Angela Rasmussen
Office: MEB 3254
Phone: 971-1096
Email: ece3510@comcast.net

Office Hours: By appointment

Textbook: Feedback Control of Dynamic Systems, 4th Ed.
Franklin, Powell, Emami-Naeini, *Prentice Hall*

Other: Class Notes by Bodson/Rasmussen (available at University Copy Center)

Course Objective:

- Principles of feedback systems
  - Laplace transforms
    - Understand how the pole location (s-plane) relates to the time domain
    - Compute the inverse Laplace transform
  - Continuous-time systems and signals
    - Understand signal properties such as boundedness and convergence
    - Determine transfer function of electrical circuits, and interconnected systems
    - Understand system properties such as stability and BIBO stability
    - Understand how a system responds to different inputs (step input and sinusoidal input)
  - Control systems
    - Understand basic elements
    - Understand steady-state errors, disturbance rejection
    - Apply the following methods:
      - Routh-Hurwitz stability test
      - Root-locus method
      - Bode plots
      - Use a Nyquist diagram
  - Discrete-time systems
    - Z-transform
    - Inverse Z-transforms
    - Properties and performance
- Methods for solving engineering problems in such areas as control systems, signal processing, communications, and circuits

Attendance: It is essential that you attend the lecture and take complete and accurate notes. You are responsible for all topics, discussions, handouts and announcements made in class. It is mandatory that you attend the labs.

Homework: In general, assignments will be due on Wednesday by 5pm. **No late assignments will be accepted**. However, your lowest homework grade will be dropped. If you plan on being absent on a day that a homework set is due, you may either turn it in earlier or have a friend turn it in for you. Homework will not be accepted late.

Although collaboration with fellow students on homework assignments and studying is encouraged, you will benefit most from the homework if you attempt to do the problems before consulting with your friends. While it is perfectly reasonable to discuss your approach to solving the problems with a friend, the final write-up of the solution must be your own work. Copying or allowing another student to copy your work is considered cheating.

Homework will be your main study guide. Therefore, think of it as preparation for each exam. Please write clearly, show all of your work in an organized manner, put problems in the proper order and staple each homework set. Make sure you understand all of the homework.

Weekly Quiz: Each Friday at the beginning of class, there will be a quiz. The quiz will cover material from the previous week and the homework turned in the prior Wednesday. **No make-up quizzes will be given**. However, your lowest quiz score will be dropped.

Exams: Two exams and a final will be given. The exams will be open book, open notes. In NO CASE will make-up exams be given unless the student obtained approval from the instructor PRIOR to the time of the exam. In emergency situations, students will be expected to produce a doctor's certificate indicating the nature and time of the medical emergency.

Labs: Attendance for lab is mandatory. Labs are **not optional.** A few of the labs require only a demonstration to the TA. These labs may be worked outside of the scheduled time.

Grading: Your final grade will be determined based on 9 homeworks, almost weekly quizzes, laboratory work, a project, 2 midterms, and a final exam. Your lowest weekly quiz grade and your lowest homework grade will be dropped. Your grade will be determined in two different ways:

1st:
Homework – 9% (lowest score dropped)
Quizes – 6% (lowest score dropped)
Labs – 15%
Project – 10%
2 Midterms – 20%
Final – 40%

2nd:
Homework – 9% (lowest score dropped)
Quizes – 6% (lowest score dropped)
Labs – 15%
Project – 10%
2 Midterms – 40%
Final – 20%

The best grade from the above two will be used as your final grade.

Grades: Your grade will be determined as follows:

A+	**97 – 100**
A	**94 – 96**
A-	**90 – 93**
B+	**87 – 89**

B	**83 – 86**
B-	**80 - 82**
C+	**77 – 79**

C	**73 - 76**
C-	**70 - 72**
D+	**67 – 69**

D	**63 – 66**
D-	**60-62**
F	**<59**

Americans with Disabilities Act Information:
The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. Please contact the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD) to make arrangements for any needed accommodations.