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Text: There is no single textbook that works for all topics. For most of the topics we cover, I will put some notes on the class website. These notes are similar to the notes I will be using in class but will generally have different examples than those I use in class. However, these notes are not complete yet.

GRADING POLICY

Exam 1	15%
Exam 2	15%
Final Exam	25%
Labs	20%
Homework/Matlab/Simulink	15%
Quizes	10%

Notes:

(1) You must have a passing average (greater than or equal to 60%) on the exams to pass the class!

(2) Homework assignments are ***due at the beginning of class on Tuesday***. No late homework will be accepted without prior approval.

(3) You must acceptably complete each lab to pass the class.

(4) For the majority of the labs, you will be required in the preceding homework to derive some relationships we will be using in lab or simulate a system (or systems). If you understand the homework the lab should not be a problem. You will be told which parts of the homework are required for the lab. You will receive a 0 on the corresponding lab if you have not done this acceptably! However, you must still complete the homework and do the lab to pass the course.

 (5) Many of the homework problems will require you to use Matlab or Simulink as part of the problem. If you do not do these parts of the problem, do not expect to receive credit for any parts of the problem.

(6) You are expected to do your own work. You can certainly talk with each other and help each other, but the work you hand in should be your own. As an example, if two people hand in the same Simulink plot and both came from the same directory, neither will receive any points!

 (7) Unless specifically told otherwise on a particular problem, you are expected to work out the problem by hand (or use Matlab). *If you write on your assignment that you used Maple and are copying the answer, expect to get no points.* You can use Maple to check your answers. You cannot turn in any Maple code or plot as part of the solution to a problem.

Quizes:

Each week we will have a quiz, usually (though not always) on Thursday. Usually before the quiz a "practice quiz" will be posted to give you an idea of the kinds of problems you are expected to be able to solve on that week's quiz.

Labs:

1) **You cannot use your laptop during the lab except for transferring files or running simulations.** I am sick and tired of people surfing the web and instant messaging during lab time, instead of paying attention to the lab, and then whining they did not have time to do the lab. Points will be deducted for inappropriate behavior.

2) You can work individually or in groups of two.

3) **Your lab must be printed out before coming to lab each week**. I reserve the right to deduct half of the lab points if you don't have your lab printed out at the time the bell rings. I will try and give you a copy of the lab on Monday in class, but if I don't you need to print it out before lab.

4) You need to read the lab before you come to lab. If you read through the lab you will (hopefully) get the *big picture* and understand what we are trying to do. If you just blindly follow the steps in the lab with no thought as to where you are going, you will get little from the labs.

5) You must write a short memo summarizing your results. This memo is due *before your next lab period.* You should include **as attachments** in the memo the plots and you made for the lab. The lab write up is generally to be computer generated and each graph needs to be labeled as a figure (with a caption). Usually students find it easier to just copy and paste all the figures they need into a document and explain the figure or answer questions as they are doing the lab. *For the most part, the memos should be short since I mostly look at the picture.*

SYLLABUS

Class 1 (9/3) - Laplace Transforms/Partial Fractions

Class 2 (9/7) – Laplace Transforms/Partial Fractions
Class 3 (9/8) – Laplace Transforms, Final Value Theorem
Lab 1 - Matlab, Simulink, the ECP systems
Class 4 (9/10) – Steady State Errors

Class 5 (9/14) - Response of 2nd Order Systems, Performance Specifications
Class 6 (9/15) - Characteristic Polynomial and Modes, Stability
 Lab 2 – Time Domain Identification of 2nd Order Systems
Class 7 (9/17) – Block Diagram Manipulation

Class 8 (9/21) – Model Matching (ITAE, Deadbeat)
Class 9 (9/22) - Quadratic Optimal Systems
Lab 3 - Time and Frequency Domain System Identification (two 1 dof systems)
Class 10 (9/24) – Quadratic Optimal Systems

Class 11 (9/28) – Steady State Errors, System Type
Class 12 (9/29) – Root Locus for Compensator Design
Lab 4 – ITAE, Deadbeat, and Quadratic Optimal Systems
Class 13 (10/1) – **Exam 1**

Class 14 (10/5) – Root Locus for Compensator Design
Class 15 (10/6) – Root Locus for Compensator Design
Lab 5 – Root Locus Design (Matlab's sisotool)
Class 16 (10/8) – Lag Compensators

Class 17 (10/12) - Coefficient Matching - Diophantine Equations
Class 18 (10/13) – Coefficient Matching - Diophantine Equations
 Lab 6 – Root Locus (PID) Design

Class 19 (10/19) – System Sensitivity
Class 20 (10/20) – System Sensitivity
Lab 7 - PI-D and I-PD Configurations
Class 21 (10/22) – Routh Array

Class 22 (10/26) – Routh Array
Class 23 (10/27) – State Variable Systems
Lab 8 – Coefficient Matching- Diophantine Equations
 Class 24 (10/29) – **Exam 2**

Class 25 (11/2) – State Variable Systems
Class 26 (11/3) - Bode Plots, Phase and Gain Margins
Lab 9 – State variable control for 1degree of freedom systems, regulator systems
Class 27 (11/5) - Bode Plots, Phase and Gain Margins

Class 28 (11/9) - Bode Plots, Phase Lead Compensators
Class 29 (11/10) – Nyquist Plots
 Lab 10 - State Variable Control of an Inverted Pendulum
Class 30 (11/12) **–** Nyquist Plots