

Course: ECE 565 **Term:** Winter 2002

Text: *Digital Control Systems - Analysis and Design, 3rd Edition*
Charles L. Phillips and H. Troy Nagle
Prentice Hall, 1995

References: Digital Control System Design, 2nd Edition
Santina, Stubberud, Hostetter
Saunders Publishing, 1994

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Office hours: Mondays 4:00 - 6:00pm and by appointment

Syllabus:

1. Review of Continuous Systems
2. Overview of Digital Control Systems
3. Discrete Time Systems & z-transforms
4. Sampled Data Systems, Reconstruction of Sampled data
5. Open Loop Systems: Transfer Functions & State Variable Models
6. Closed Loop Systems: Transfer Functions & State Variable Models
7. Time Response Characteristics
8. Stability Analysis Techniques
9. Digital Controller Design using Transfer Functions
10. Digital Controller Design using State Variables
11. Physical Realization of Digital Controllers

Grading:

assignment 1	25 points
assignment 2	30 points
assignment 3	45 points
midterm exam	100 points
final exam	150 points
total	350 points

Homework will be assigned that will be indicative of test material. These will not be collected. Answers will be posted and discussed in class

section	Topics	comments	date
Chapter 1 notes	INTRODUCTION to Digital Control Systems REVIEW: Continuous Control Systems		Jan 7
notes Chapter 2	REVIEW: Continuous Control Systems Difference Equations, Z-Transforms	start ch 2 homework	Jan 14
	break		Jan 21
Chapter 2 Chapter 3	Z-Transforms, Signal Flow Graphs, Simulation Block Diagrams Sampled Data Systems, Ideal Sampler	start ch 3 homework	Jan 28
Chapter 3 Chapter 4	Data Reconstruction, Digital To Analog Conversions, Analog To Digital Conversions Open Loop Systems, modified z-transforms, systems with delays	ch 2 homework due	Feb 4
Chapter 4 Chapter 5	State variable models Closed Loop Systems	start ch 4 homework ch 3 homework due	Feb 11
Chapter 5	State Variable models for feedback systems Mid Term Review	ch 4 homework due start ch 5 homework	Feb 18
Chapter 6:	Mid-Term Exam Time Response – Transient Behavior,	ch 5 homework due	Feb 25
	break		Mar 4
Chapter 6:	Mapping S-plane to z-plane Steady State Accuracy	start ch 6 homework start assign 1	Mar 11
Chapter 7	characteristic polynomial, characteristic equation, bilinear tranform, ruth-hurwitz, jury stability	start ch 7 homework ch 6 homework due	Mar 18
Chapter 7 chapter 8	root-locus, bode plots Tranfer Function Design, System Parameters,	assgn. 1 due start assign 2	Mar 25
chapter 8 chapter 9	PI and PID Controllers Pole placement design	ch 7 homework due start ch 9 homework	Apr 1
chapter 9	State Estimation, Full Controllability, Observability	assgn. 2 due	Apr 8
chapter 9	Partial Order Observers Systems with inputs	start assign 3	Apr 15
chapter 10	Plant Parameter Estimation Review for Final Exam	ch 9 homework due	Apr 22
	Final Exam: Monday Apr 29, 7:30-10:30	assgn. 2 due	