

CEN 455
First Semester 1430/1431H (Fall 2009-10)
Introduction to Digital Control

Time: Saturday, Monday, Wednesday: 3:00-3:50 PM @ B 092
Instructor: Dr. Ghulam Muhammad
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Text: “Control System Engineering”, by Norman S. Nise, 5th Edition, 2008 by John Wiley & Sons, Inc.

References: “Digital Control Engineering”, by M. S. Fadali and A. Visioli, 2009, Academic Press.

Grading:

Home Work and Quizzes:	10%
Attendance:	10%
2-Midterms	40%
Final	40%

Course Outline

	Topic
	Part I: Continuous systems
1	Introduction to Control Systems and Matlab
2	Mathematical representation of systems (Differential equations, transfer function)
3	System analysis in time domains (Time response, steady state error, stability)
4	Root-Locus analysis and compensator design (PID)
First Midterm Exam 28/11/1430H (Monday, November 16, 2009)	
	Part II: Discrete systems
5	Digital Control: Introduction, Digitization, effect of Sampling.
6	Discrete models of sampled data systems: Difference equations and z-Transform.
7	Time response and stability analysis.
8	Design of discrete-time control systems (Root-Locus).
Second Midterm Exam 23/1/1431H (January 09, 2010)	
9	Compensator design (Pole placement + Ziegler-Nichols approach).
10	Advanced Topics: - Adaptive and predictive control. - Control of nonlinear systems.

Please download lecture notes from the above mentioned webpage and bring printed copy of corresponding lectures in the classroom.

Course Code : CEN 455

Course Title : Introduction to Digital Control

Prerequisites : CEN 340 and MATH 244

Credit Hours : 3 Lecture Hrs: 3 Lab Hrs: 0 Tut. Hrs: 1

Part I: Continuous Systems: Review of mathematical representation of systems, transfer functions, system analysis in frequency and time domains, system stability, and compensator design.

Part II: Discrete Systems: System Modeling and representation; Difference equations; review of Z transform; Review of sampling and reconstruction; Stability analysis; Design of discrete-time control systems; State-space techniques.

Textbook: Norman S. Nise , "Control System Engineering", John Wiley & Sons.