KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

Electrical Engineering Department

EE 432 Digital Control Systems — Tentative Schedule [051]

Date	Topics	Sections	HW/Quiz	Laboratory
Week 1 September 11, 13	Introduction to digital control systems.	1.1 - 1.8		**No scheduled meeting**
Week 2 September 18, 20	Discrete time systems- Transform methods.	2.1 - 2.6	HW #1	**Exp.#1** Analysis with MATLAB
Week 3 September 25, 27	Flow graphs - State variables- Transfer functions.	2.7 - 2.10	HW #2 QUIZ 1	**No scheduled meeting (National Holiday)**
Week 4 October 2, 4	Solutions of the state-equation.	2.11	HW #3 QUIZ 2	**Exp.#2** Sample/Hold unit with zero-order hold.
Week 5 October 9, 11	Sampled-data control systems - Ideal Sampler - Evaluation of E*(s) -	3.1 - 3.4	HW #4 QUIZ 3	**Exp.#3** Simulink Primer
Week 6 October 16, 18	Properties of E*(s) - Data Re-construction - A/D - D/A.	3.5 - 3.8	HW #5 QUIZ 4	**Problem Session # 1**
Week 7 October 23, 25	E(Z) & E*(Z) - Pulse TF - Open Loop Systems with digital filter-Modified Z-Transform	4.1 - 4.5	**Major-1**	**Exp.#4** Matlab Simulation of Digital Control Systems.
Week 8 November 13, 15	Systems with time delays- Nonsynchronous sampling-Discrete state equation.	4.6 - 4.11	HW #6 QUIZ 5	**Exp. #5** Sampled-data Servo Control System
Week 9 November 20, 22	Closed-loop systems: concepts, derivation procedure-State variable models.	5.1 - 5.4	HW #7 QUIZ 6	**Exp. #6** Performance of a Digital PID Controller.
Week 10 November 27, 29	Time response - Characteristics Equation -Mapping S&Z Planes, Steady state accuracy	6.1 - 6.5	HW #8 QUIZ 7	**Exp. #7** Pole Placement Controller Implementation
Week 11 December 4, 6	Stability - Bilinear transformation - Routh-Hurwitz Criterion - Jury test	7.1 - 7.5	HW #9 QUIZ 8	**Problem Session #2**
Week 12 December 11, 13	Root-Locus, Nyquist Criterion, Bode diagram, Frequency Response.	7.6 - 7.10	HW #10 QUIZ 9	**Exp. #8** Discretization of Continuous-time State Space Equations.
Week 13 December 18, 20	Compensation: Lead, Lag, Lead-Lag	8.1 - 8.7	**Major-2**	**Exp. #9** Digital Servo Workshop
Week 14 December 25, 27	Integration and Differentiation filters, PID Controller Design.	8.8 - 8.11	QUIZ 10	**Exp. #10** Digital Pendulum Control System
Week 15 January 1, 3	REVIEW			**Exp. #11** Magnetic Levitation System

Grade Distribution:

Laboratory	Quizzes / HW / Attendance	Major Examinations	Project	Final
20%	10% - 3% - 2%	15% - 15%	5%	30%

Text Book: Digital control System Analysis and Design. (3rd Edition) Charles L. Phillips & H. Troy Nagle

Course Instructor:

Instructor	Office	Tel. #	e-mail
Dr. Ahmad A. Masoud	B-14, Rm-210-1	3740	masoud@kfupm.edu.sa

Laboratory Instructor(s):

Instructor	Office	Tel. #	e-mail	Section	Time	ROOM
Mr. S. Azhar	7/132	2369	saadali@kfupm.edu.sa	51 (Saturday)	2:10 - 5:10 PM	7-214

Majors:

Examination	Day	Date	Time	Place
First Major	**Tuesday**	**October 25, 2005**	**7:00 - 9:00**	**TBA**
Second Major	**Monday**	**December 20, 2005**	**7: 00- 9:00**	**TBA**

Remarks:

1. Students are required to Read and COMPREHEND the information contained in the instruction sheets prior to coming to the laboratory.
2. The handouts for each problem session will be distributed well ahead of each session.
3. Students are required to work on all the problems prior to coming to the session. They are strongly encouraged to solicit assistance from their instructors.
4. Attending the full problem session is COMPULSORY.
5. A quiz will be administered at the end of each session.
6. Problem sessions and lab reports carry the same weight.