King Saud University
Department of Electrical Engineering

EE 451: Systems Simulation

First Semester 1426/27 (2005/2006)

Instructor:

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Textbook:

Introduction to MATLAB 6 for Engineers by William J. Palm III, McGraw-Hill, 2001

References:

1. Mastering MATLAB 6 by Duane Hanselman and Bruce Littlefield, Prentice-Hall, 2001.
2. Mastering SIMULINK 4 by James B. Dabney and Thomas L. Harman, Prentice-Hall, 2001.
3. Modeling and Simulation of Dynamic Systems by Robert Woods and Kent Lawrence, Prentice-Hall, 1997.

Prerequisites: EE 351.

Co requisites: EE 301, Math 204.

Course Objectives:

Learn modern simulation techniques using Matlab/Simulink for simulating linear systems as well as nonlinear systems. First order continuous systems are introduced to the student first so that they can compare what they studied in previous courses about linear system response. The system is solved using mathematical derivation to determine the output for simple input functions such as step or sinusoidal input. The system is then simulated using SIMULINK to obtain the output waveforms for the same input waveforms. Next some nonlinearity is introduced so that student can appreciate the power of SIMULINK for simulating nonlinear systems very easily. Next, second order systems are introduced linear as well as nonlinear. The concept of state-variables is introduced and the approach is compared with the normal approach. Each student selects a project

that he works on during the course progress. This project may be one of the demos included with SimPowerSystems Block-Set. The student is expected to understand the demo and make certain required modifications and then makes a power-point presentation to his class mates and me at the end of the semester.

Topics Covered:

Mathematical Modeling, Derivation of a Mathematical Model. Continuous Systems. First Order Systems. Second Order Systems. Simulation Diagrams First Order Systems. Higher Order Systems. State Variables, Nonlinear Systems. SIMULINK. Simulation of Linear Systems. Simulation of Non-Linear Systems.

Evaluation:

There are graded home works, two 2-hour mid-term exams and a three-hour final exam. The course grade distribution is as follows:
10% Attendance, in-class quizzes and tutorial home-work
40% Two Midterm Exams
10% Project
40% Final Examination

Weekly Teaching Plan

Wk#	DELIVERABLES
1	Mathematical Modeling.
2	Derivation of a Mathematical Model.
3	Continuous Systems.
4	First Order Systems.
5	Second Order Systems.
6	Simulation Diagrams First Order Systems.
7	Higher Order Systems.
8	State Variables.
9	Nonlinear Systems.
10	SIMULINK.
11	Simulation of Linear Systems.
12	Simulation of Non-Linear Systems.
13	Project Presentations