

# **SYST 320: Dynamic Systems II**

## **Spring 2007**

### **Course Overview**

In engineering, it is important to predict the behavior of systems that change in time. Such systems are called *dynamic systems*. This course teaches students to model a large class of physical systems and to solve these systems both analytically and numerically.

This course is a follow-on course to SYST 220, Dynamic Systems I. In this course, the focus is on *continuous* time systems and the emphasis is on physical systems, including mechanical systems (translational and rotational) and electrical systems. The course studies the response of these systems to external inputs, both in the time domain and the frequency domain. The objective is to design systems whose responses meet specified requirements.

Class Hours: Monday, Wednesday, noon – 1:15 pm.  
Location: Robinson B room 118.

Pre-requisites: SYST 220 (Dynamic Systems I)  
MATH 203 (Matrix Algebra)  
MATH 214 (Differential Equations)  
PHYS 260 & 261 (University Physics II)

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Room: Science & Tech II, room 313

Office hours: Tue: 4:00 – 5:00 pm, Thu: 9:15 – 10:15 am

Textbook: Palm, W. J., *System Dynamics*. McGraw-Hill, 2005.

### Student Evaluation Criteria

Homework assignments	18%
Class participation	3%
Group project	9%
Midterm 1	20%
Midterm 2	20%
Final exam	30%

### Syllabus and Course Schedule

Mon. Jan. 22	Introduction	
Wed. Jan. 24	Rigid-Body Mechanical Systems	
Mon. Jan. 29	Rigid-Body Mechanical Systems	
Wed. Jan. 31	Solutions of Dynamic Systems	Hmwk #1 due
Mon. Feb. 5	Solutions of Dynamic Systems	
Wed. Feb. 7	Solutions of Dynamic Systems	Hmwk #2 due
Mon. Feb. 12	Solutions of Dynamic Systems	
Wed. Feb. 14	Springs and Dampers	Hmwk #3 due
Mon. Feb. 19	Springs and Dampers	
Wed. Feb. 21	Springs and Dampers	Hmwk #4 due
Mon. Feb. 26	Block Diagrams / State-Variable Models	
Wed. Feb. 28	Exam 1: Chap. 1-4	
Mon. Mar. 5	Block Diagrams / State-Variable Models	
Wed. Mar. 7	Block Diagrams / State-Variable Models	Hmwk #5 due
Mon. Mar. 12	Spring Break	
Wed. Mar. 14	Spring Break	
Mon. Mar. 19	Other Applications	
Wed. Mar. 21	Other Applications	Hmwk #6 due
Mon. Mar. 26	Electrical Systems	
Wed. Mar. 28	Electrical Systems	Hmwk #7 due
Mon. Apr. 2	Electrical Systems	
Wed. Apr. 4	Exam Review	Hmwk #8 due
Mon. Apr. 9	Exam 2: Chap. 5-7	
Wed. Apr. 11	Time-Domain Analysis	Hmwk #9 due
Mon. Apr. 16	Time-Domain Analysis	
Wed. Apr. 18	Time-Domain Analysis	Hmwk #10 due
Mon. Apr. 23	Frequency-Domain Analysis	
Wed. Apr. 25	Frequency-Domain Analysis	Group projects due
Mon. Apr. 30	Frequency-Domain Analysis	
Wed. May. 2	Review	Hmwk #11 due
Mon. May 14	Final Exam, 10:30 am – 1:15 pm	