

SYST 202: Continuous Dynamic Systems Modeling

Spring 2006

Course Overview

In engineering, it is important to predict the behavior of systems that change in time. Such systems are called *dynamical systems*. This course teaches students to model a large class of physical systems and to solve these systems both analytically and numerically. This course follows SYST 201. Here, the focus is on *continuous* time systems and the emphasis is on physical systems (mechanical and electrical). A supplemental one unit course, SYST 203, teaches students to solve dynamical systems numerically using a computer.

Class Hours: Tuesday and Thursday, 10:30 am – 11:45 am, Krug Hall room 19.

Pre-requisites: SYST 201

Co-requisites: MATH 203 (Matrix Algebra)
MATH 214 (Differential Equations)
PHYS 260 (Physics II)

Instructor: John Shortle
jshortle@gmu.edu
703-993-3571
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

Tue. Jan. 24	Introduction	
Thu. Jan. 26	Rigid-Body Mechanical Systems	
Tue. Jan. 31	Rigid-Body Mechanical Systems	Hmwk #1 due
Thu. Feb. 2	Solutions of Dynamical Systems	
Tue. Feb. 7	Solutions of Dynamical Systems	Hmwk #2 due
Thu. Feb. 9	Solutions of Dynamical Systems	
Tue. Feb. 14	Solutions of Dynamical Systems	Hmwk #3 due
Thu. Feb. 16	Springs and Dampers	
Tue. Feb. 21	Springs and Dampers	Hmwk #4 due
Thu. Feb. 23	Springs and Dampers	
Tue. Feb. 28	Block Diagrams / State-Variable Models	Hmwk #5 due
Thu. Mar. 2	Exam 1: Chap. 1-4	
Tue. Mar. 7	Block Diagrams / State-Variable Models	
Thu. Mar. 9	Block Diagrams / State-Variable Models	Hmwk #6 due
Tue. Mar. 14	Spring Break	
Thu. Mar. 16	Spring Break	
Tue. Mar. 21	Electrical Systems	
Thu. Mar. 23	Electrical Systems	Hmwk #7 due
Tue. Mar. 28	Electrical Systems	
Thu. Mar. 30	Electrical Systems	Hmwk #8 due
Tue. Apr. 4	Time-Domain Analysis	
Thu. Apr. 6	Time-Domain Analysis	Group mid-reports due
Tue. Apr. 11	Time-Domain Analysis	Hmwk #9 due
Thu. Apr. 13	Exam 2: Chap. 5-7	
Tue. Apr. 18	Frequency-Domain Analysis	
Thu. Apr. 20	Frequency-Domain Analysis	Hmwk #10 due
Tue. Apr. 25	Frequency-Domain Analysis	
Thu. Apr. 27	Control Systems	Group projects due
Tue. May. 2	Control Systems	
Thu. May. 4	Review	Hmwk #11 due
Thu. May 11	Final Exam, 10:30 am – 1:15 pm	