

SYST 221: Systems Modeling Laboratory

Corequisite: SYST 220

Spring 2009

Course Description

This course introduces students to fundamental principles of computer modeling using an engineering modeling environment such as MATLAB[®] and Simulink. Students will learn how to develop computer solutions to solve and interpret mathematical models. Problems from topics covered in Dynamical Systems I (SYST 220) will be taken up for class examples and lab assignments. Throughout the course we will discuss different features and capabilities of the MATLAB[®] software. Each lecture will be followed by working on exercises involving concepts covered that day.

Class Hours: Friday, 1:30 P.M – 4:10 P.M, Innovation Hall 326, Fairfax Campus

Instructor: Poornima Balakrishna
pbalakri@gmu.edu
703-993-3684
Science & Tech II, Room 19
Office hours: Wednesday 2:00 P.M. to 4:00 P.M., or by appointment

Textbook: System Dynamics by William J. Palm III, Mc Graw Hill (same as SYST 220)
Optional reference book for Matlab/Simulink:

Introduction to MATLAB 7 for Engineers (Paperback) by William J Palm III

Software: Matlab with Simulink, Release V.14 with Service pack 05 or later (available in GMU bookstore)

Exam dates:
Midterm: Friday, March 6th, 2009
Final : Friday, May 8th, 2009

Fundamental Rules:

- Make-up exams will *only* be given for extreme situations, and *only* if I am contacted before the exam is given and full arrangements are established. Full adherence to this policy is the responsibility of the student.
- The exam dates above are tentative, and it is the students' responsibility to keep abreast of changes.
- Students must submit their class-work at the end of each lecture, which will count towards the homework grade.
- Additional exercises will be assigned as homework each week. Homework must be turned in at the beginning of each class. There will be a penalty of 10% of the total grade for each day that homework is late. No points will be awarded if homework is turned in after solutions have been posted.
- Students must work independently on homework assignments, although discussing concepts and programming logic is permitted. Please note that if you do not understand the homework you will not be able to perform well on the exams.

Student Evaluation Criteria

Homework and class assignments	40%
Midterm	25%
Final exam	35%

Academic Policy:

All academic policies as given in the Honor System and code will be strictly followed. Visit URL <http://www.gmu.edu/catalog/apolicies/#Anchor12>

Course Syllabus

January 23 rd	Week 1	Introduction to the MATLAB environment, Mathematical operations involving scalars, working with variables, Introduction to linear algebra, Arrays, and array operations in MATLAB,
January 30 th	Week 2	Writing MATLAB scripts, plotting and formatting graphs, built-in library functions, Examples from Chapter 1 (including polynomials, curve fitting, interpolation)
February 6 th	Week 3	Writing function files, invoking functions Examples from Chapter 2
February 13 th	Week 4	Solving algebraic equations, systems of linear equations, solving differential equations Examples from Chapter 3
February 20 th	Week 5	Programming using MATLAB (loops, conditional statements, switch-case statements)
February 27 th	Week 6	Transfer function analysis, Higher order differential equations Examples from Chapter 3
March 6th	Week 7	Mid-Term Exam
March 13 th	Week 8	Spring Break
March 20 th	Week 9	Numerical methods
March 27 th	Week 10	Examples from Chapter 4
April 3 rd	Week 11	Examples from Chapter 4
April 10 th	Week 12	Introduction to Simulink and Linear Models
April 17 th	Week 13	Simulink and Nonlinear Models Examples from Chapter 5
April 24 th	Week 14	Examples from Discrete Dynamical Systems
May 1 st	Week 15	Examples from Discrete Dynamical Systems
May 8th	Week 16	Final Examination