SYST 221
SYSTEMS MODELING LABORATORY

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http://mason.gmu.edu/~pcosta

Teacher Assistant: Mr. Alireza Bitaraf Haghighi

Course Description

Spring 2012

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 Details

Co-requisites: SYST 220 – Dynamical Systems I

Classes

* *Room 129 of the Innovation Hall.*
* *Fridays, from 10:30 a.m. to 1:10 p.m.*

Office hours

* *Room 2227 of the Engineering Building.*
* *Wednesdays, from 4:00 p.m. to 6:00 p.m., or by appointment.*
* *Prof. Costa contact data: (703) 993-9989 / pcosta@gmu.edu*
* *Mr. Haghighi's contact data: abitaraf@masonlive.gmu.edu*

Administrative

* *Registration deadline: Jan 31st.*
* *Drop without Tuition Penalty Deadline: Jan 31st.*
* *Drop with Tuition Penalty dates: Feb 1st to Feb 24th.*
* *Final Drop deadline: Feb 24th.*

Logistics and Expected Behavior

1. Attendance in class is essential. Information will be presented that will not necessarily be in the book, and is almost certain to be in both the midterm and final exams.
2. You are allowed to enter or leave at any time, provided you do your best to avoid disrupting the activity going on.
3. Please make sure you have your cell phone, tablet, pager, etc., in silent mode. Should you find yourself in extreme need to answer an incoming call, just leave the room to do so.
4. Students must submit their class-work at the end of each lecture, which will count towards the homework grade.
5. Students are permitted to interact on homework assignments, but your write-up must be your own. Assignments are intended to provide practical, hands-on experience with the ideas presented in the course.
6. Late assignments, when properly justified, will receive reduced credit in accordance with the late assignment policy (below in this document). No points will be awarded if homework is turned in after solutions have been posted.
7. 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.
8. The exam dates and scheduling provided below are tentative, and it is the students' responsibility to keep abreast of changes.
9. Academic Policy: All academic policies as given in the Honor System and code will be strictly followed. Visit URL: http://catalog.gmu.edu/content.php?catoid=17&navoid=1315

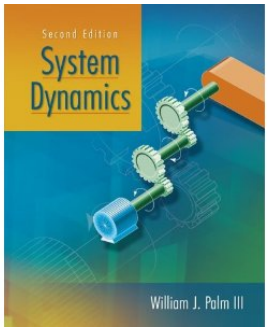
Exercise planning, be proactive and do your best to stay ahead of schedule.

Course Outline:

Week 1	1/27	Introduction to the MATLAB environment. Mathematical operations involving scalars, working with variables. Introduction to linear algebra. Arrays, and array operations in MATLAB.
Week 2	2/3	Writing MATLAB scripts, plotting and formatting graphs, built-in library functions. Examples from Chapter 1 (including polynomials, curve fitting, interpolation).

Week 3	2/10	Writing function files, invoking functions. Examples from Chapter 2.
Week 4	2/17	Solving algebraic equations, systems of linear equations, solving differential equations Examples from Chapter 3
Week 5	2/24	Programming using MATLAB (loops, conditional statements, switch-case statements)
Week 6	3/2	Transfer function analysis, Higher order differential equations Examples from Chapter 3
Week 7	3/9	Mid-Term Exam
-x-	3/16	Spring Break
Week 8	3/23	Numerical methods
Week 9	3/30	Examples from Chapter 4
Week 10	4/6	Examples from Chapter 4
Week 11	4/13	Introduction to Simulink and Linear Models
Week 12	4/20	Simulink and Nonlinear Models Examples from Chapter 5
Week 13	4/27	Examples from Discrete Dynamical Systems
Week 14	5/4	Examples from Discrete Dynamical Systems
Week 15	5/11	Final Examination

Textbook



System Dynamics, William J. Palm III.
McGraw Hill; 2nd edition (January 26, 2009). 848 pp.
ISBN-10: 0073529273.
ISBN-13: 978-0073529271.

Students are encouraged to also refer to the following resource:

- Introduction to MATLAB for Engineers (Paperback), William J. Palm III. McGraw-Hill Science; 3rd edition (February 8, 2010). ISBN-10: 0073534870.

Software

MATLAB with Simulink, V.14 with service pack 05 or later (available in GMU bookstore)

Grading

The grading structure of this course is as follows:

- Assignments (35% of grade)
- Midterm (30% of grade)
- Final Exam (35% of grade)

Assignments

There will be assignments posted via Blackboard during the course. Each assignment will have its respective due date defined during the announcement. I might sometimes not grade the assignments in detail, but will always use it to gain insight about the understanding of the students on the subject.

You are not prevented to work with your peers on the exercises, and are even encouraged to do so. However, each student must provide his/her own answers, and I might verify whether he/she actually worked in his/her respective exercise and understood the solution provided. In any case, past experience consistently shows that students who didn't keep up with the assignments have had a hard time with the exams.

Late assignment policy: Each assignment is out of 10 points. If you handle your assignment late by 3 days you can earn a max of 7 points. An assignment handled more than 3 days late will yield 0 points. Always check for grades on Blackboard. If you don't see the grade, report to me by the next class after assignments have been returned. I will not entertain missing grade requests that come later in the semester.

Exams

Both the Midterm and the Final will be in-class exams.

BEST WISHES FOR A GREAT SEMESTER!!!

Fairfax, January 10, 2012.