

SYST 500

Fall 2011

Quantitative Methods for Systems Engineering, Operations Research, and Computational Science

Description:

This course is designed to provide the basic quantitative foundations that students need to pursue a graduate program in Systems Engineering, Operations Research, and Computational Science. Topics include vector and matrices, differential equations, Laplace transforms and probability theory. A brief review of calculus and complex numbers will also be provided. The course will require some computational work using the software *Matlab*, available on the GMU computer systems.

Pre-requisites:

MATH 203 (Matrix Algebra)
MATH 113 (Analytic Geometry and Calculus I)
MATH 114 (Analytic Geometry and Calculus II)

Text:

Advanced Engineering Mathematics (Selected Chapters) by Peter O'Neil (2010) – ISBN-13 #978-1-1-1163288-5, ISBN-10 #1-111-63288-X

Software: Matlab+Simulink R2011A, Student Version, 11th edition (other versions may suffice)

Instructor: Dr. Monica Carley-Spencer, mcarley@gmu.edu, (434) 964-5018

Policy: All work is to be done individually. All students must abide by the GMU Honor Code. Homework is due at the beginning of class, one class period from the date assigned, unless otherwise indicated. Late homework will be not be accepted.

Class website: login to Blackboard and click on this course (<https://mymason.gmu.edu>)

Class outline:

Week 1	Thursday 9/1	Introduction, vectors and matrices		
Week 2	Thursday 9/8	Matrices: rank, determinants, inverse		HMWK 1 due
Week 3	Thursday 9/15	Eigenvalues/vectors, complex numbers		HMWK 2 due
Week 4	Thursday 9/22	Calculus review		HMWK 3 due
Week 5	Thursday 9/29	First-order differential equations		HMWK 4 due
Week 6	Thursday 10/6	Higher-order differential equations		HMWK 5 due
Week 7	Thursday 10/13	Higher-order differential equations		HMWK 6 due
Week 8	Thursday 10/20	MID-TERM EXAM	Weeks 1-6 (HMWKs 1-5)	
Week 9	Thursday 10/27	Systems of differential equations		HMWK 7 due
Week 10	Thursday 11/3	Laplace transforms		HMWK 8 due
Week 11	Thursday 11/10	Power and geometric series		HMWK 9 due
Week 12	Thursday 11/17	Probability and random variables		HMWK 10 due
Week 13	Thursday 11/24	Thanksgiving recess – No Class		
Week 14	Thursday 12/1	Multiple random variables & Review		HMWK 11 due
Week 15	Thursday 12/8	Review		HMWK 12 due
Week 16	Thursday 12/15	FINAL EXAM	Comprehensive	Extra credit due

Grading: Homework = 36%, Midterm Exam = 32%, Final Exam = 32%

A-/A/A+: 90-92, 93-97, 98-100%, **B-/B/B+:** 80-82, 83-87, 88-89%, **C-/C/C+:** 70-72, 73-77, 78-79%, **F:** < 70%