

George Mason University
Department of Systems Engineering

SYST 500 / CSI 600

Fall 2011

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

Instructor: Dr. Tom Clemons; tclemons@gmu.edu

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 (6th Ed.) by Peter O'Neil (Selected Chapters).

ISBN-10: 111163288X; ISBN-13: 9781111632885

Software: Matlab+Simulink R2011A, Student Version, 11th edition

ISBN-10: 0-982-58383-4; ISBN-13: 978-0-982-58383-8

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 not be accepted.

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

Class outline:

Week 1	Thursday 9/1	Introduction, Vectors	Chp 6	
Week 2	Thursday 9/8	Matrices and Linear Systems	Chp 7	HMWK 1 due
Week 3	Thursday 9/15	Determinants and Inverses	Chp 8	HMWK 2 due
Week 4	Thursday 9/22	Complex numbers; Eigenvalues/vectors	Chp 20 & 9.1-.4	HMWK 3 due
Week 5	Thursday 9/29	Calculus review		HMWK 4 due
Week 6	Thursday 10/6	Power and geometric series	Chp 21 & 23	HMWK 5 due
Week 7	Thursday 10/13	First-order differential equations	Chp 1	HMWK 6 due
Week 8	Thursday 10/20	MID-TERM EXAM Weeks 1-6 (HMWKs 1-5)		HMWK 7 due
Week 9	Thursday 10/27	Higher-order differential equations	Chp 2	HMWK 8 due
Week 10	Thursday 11/3	Higher-order differential equations	Chp 2	HMWK 9 due
Week 11	Thursday 11/10	Laplace transforms and Fourier Series	Chp 3	HMWK 10 due
Week 12	Thursday 11/17	Systems of differential equations	Chp 10	HMWK 11 due
Week 13	Thursday 11/24	Thanksgiving recess – No Class		
Week 14	Thursday 12/1	Probability and random variables	Chp 26	HMWK 12 due
Week 15	Thursday 12/8	Multiple random variables & Review	Chp 27	HMWK 13 due
Week 16	Thursday 12/15	FINAL EXAM Weeks 7-15 (HMWKs 6-13)		Extra Credit due

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

A/A-: 100-93, 92-90%; **B+/B/B-:** 89-87, 86-83, 82-80%; **C+/C/C-:** 79-77, 76-73, 72-70%; **F:** < 70%