George Mason University
Department of Systems Engineering

SYST 500 / CSI 600 **Fall 2006**
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 213 (Analytic Geometry and Calculus III)
MATH 214 (Elementary Differential Equations)

Texts:
Dennis G. Zill and Michael R. Cullen, *Advanced Engineering Mathematics (3rd Edition)*, Jones and Bartlett (2005)
Hwei Hsu *Probability, Random Variables and Random Processes Schaum Outline Series*, McGraw Hill, 1996

Instructor: Dr. Monica Carley-Spencer mcarley@gmu.edu (703) 983-7045

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

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: http://mason.gmu.edu/~mcarley/syst500

Class Outline:

Week 1	Tuesday 8/29	vectors and matrices	Z&C: Ch 7	
Week 2	Tuesday 9/5	matrices, linear systems, intro Matlab	Z&C: 8.1-8.2, other	HMWK 1 due
Week 3	Tuesday 9/12	matrices: rank, determinants, inverse	Z&C: Ch 8.3-8.6	HMWK 2 due
Week 4	Tuesday 9/19	eigenvalues/vectors, complex numbers	Z&C: Ch 8.8	HMWK 3 due
Week 5	Tuesday 9/26	review of calculus	Other sources	HMWK 4 due
Week 6	Tuesday 10/3	differential equations	Z&C: Ch 1, 2	HMWK 5 due
Week 7	Tuesday 10/10	*** no class ***		
Week 8	Tuesday 10/17	MID-TERM EXAM	Ch7, Ch8, & Calculus	
Week 9	Tuesday 10/24	higher-order differential equations	Z&C: Ch 3.1, 3.3	HMWK 6 due
Week 10	Tuesday 10/31	higher-order differential equations, systems of differential equations	Z&C: Ch 3.4, 3.11	HMWK 7 due
Week 11	Tuesday 11/7	systems of differential equations	Z&C: Ch 10.1-10.2	HMWK 8 due
Week 12	Tuesday 11/14	Laplace transforms	Z&C: Ch 4	HMWK 9 due
Week 13	Tuesday 11/21	power and geometric series	Z&C: Ch 5.1, other	HMWK 10 due
Week 14	Tuesday 11/28	probability and random variables	Hsu: Ch 1-2	HMWK 11 due
Week 15	Tuesday 12/5	multiple random variables	Hsu: Ch 3	HMWK 12 due
Week 16	Tuesday 12/12	FINAL EXAM (7:30-10:15 PM)	Comprehensive	