George Mason University
Department of Systems Engineering

SYST 500 / CSI 600   **Fall 2008**
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)
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

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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	Wednesday 8/27	Introduction, vectors and matrices	Z&C: Ch 7, 8.1-8.2	
Week 2	Wednesday 9/3	Matrices: rank, determinants, inverse	Z&C: Ch 8.3-8.6	HMWK 1 due
Week 3	Wednesday 9/10	Eigenvalues/vectors, complex	Z&C: Ch 8.8	HMWK 2 due
Week 4	Wednesday 9/17	Calculus review		HMWK 3 due
Week 5	Wednesday 9/24	First-order differential equations	Z&C: Ch 1, 2	HMWK 4 due
Week 6	Wednesday 10/1	Higher-order differential equations	Z&C: Ch 3.1, 3.3	HMWK 5 due
Week 7	Wednesday 10/8	Higher-order differential equations	Z&C: Ch 3.4, 3.11	HMWK 6 due
Week 8	Wednesday 10/15	MID-TERM EXAM	Material from Weeks 1-6	
Week 9	Wednesday 10/22	Systems of differential equations	Z&C: Ch 10.1-10.2	HMWK 7 due
Week 10	Wednesday 10/29	Laplace transforms	Z&C: Ch 4	HMWK 8 due
Week 11	Wednesday 11/5	Power and geometric series	Z&C: Ch 19.1, 5.1	HMWK 9 due
Week 12	Wednesday 11/12	Probability and random variables	Hsu: Ch 1-2	HMWK 10 due
Week 13	Wednesday 11/19	Multiple random variables	Hsu: Ch 3	HMWK 11 due
Week 14	Wednesday 11/26	Thanksgiving recess – No Class		
Week 15	Wednesday 12/3	Review		HMWK 12 due
Week 16	Wednesday 12/10	FINAL EXAM (7:30-10:15 pm)	Comprehensive	

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

        A: 90-100%, **B**: 80-89%, **C**: 70-79%, **F**: $< 70\%$