ENG ME 566 Advanced Engineering Mathematics

2008-2009 Catalog Data:
ENG ME 566 Advanced Engineering Mathematics Prereq: CAS MA 225 and CAS MA 226; senior standing, and consent of instructor. Introduces students of engineering to various mathematical techniques which are necessary in order to solve practical problems. Topics covered include a review of calculus methods, elements of probability and statistics, linear algebra, transform methods, difference and differential equations, numerical techniques, and mathematical techniques in optimization theory. Examples and case studies focus on applications to several engineering disciplines. The intended audience for this course is advanced seniors and entering MS engineering students who desire strengthening of their fundamental mathematical skills in preparation for advanced studies and research. 4 cr.

Class/Lab Schedule: 4 lecture hours per week

Status in the Curriculum: Elective

Textbook(s) and/or Other Required Material: E. Kreyszig, *Advanced Engineering Mathematics*, 7th Edition, Wiley, 1992.

Coordinator: James R. Perkins, Associate Professor, Mechanical Engineering

Prerequisites by topic:
1. An understanding of single and multiple variable calculus, as taught in the MA 123, MA 124, MA 225 sequence.
2. An exposure to difference and differential equations, as taught in MA 226.

Goals:
This senior/graduate student mezzanine-level course provides students of engineering with a review of various mathematical techniques that are necessary in order to solve practical problems. The intended audience for this course is advanced seniors and entering MS engineering students, who desire strengthening of their fundamental mathematical skills, in preparation for advanced studies and research.

Course Learning Outcomes:
As outcomes of completing this course, students will:

i. Strengthen their fundamental mathematical skills, in preparation for advanced studies and research;
ii. Gain an understanding of how to use mathematics to address practical operational issues facing manufacturing systems engineers.

Course Learning Outcomes mapped onto Program Outcomes:

Program:	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Course:	i, ii	ii			i, ii				ii		i,ii			
Emphasis:	3	4	1	1	5	1	1	1	3	1	3	1	1	1

Topics:

1. Review of calculus methods
2. Elements of probability and statistics
3. Linear algebra
4. Transform methods (Laplace, Fourier, z)
5. Difference and differential equations
6. Numerical techniques
7. Mathematical techniques in optimization theory

Contribution of Course to Meeting the Professional Component:
Engineering topics: 25% Math: 75%

Status of Continuous Improvement Review of this Course:
Prepared by: Professor James R. Perkins Date: 4/10/09