DEPARTMENT OF MATHEMATICS

COURSE ANNOUNCEMENT FOR FALL 2007

MATH 570a,b

Methods of Applied Mathematics

(This is a re-designed version which covers the basic material needed from the stated prerequisite 425a. Special permission may be required to register without the the prerequisite.)

Course Descriptions: These courses are specifically designed for engineers, scientists and applied mathematicians. The most fundamental topics in Advanced Calculus and Real Analysis will be stressed. Homework, take home midterms and a final project will determine the grade in the course. The course will be taught from an applied standpoint with the goal of imparting a working knowledge of the subject. Topics will include

(570a) Metric spaces, subspaces and product spaces, convergence of continuous functions, closed sets, compactness, completion of metric spaces, function spaces, linearity, Banach spaces, linear operators, spaces of linear functionals, the Riemann integral as a functional, completion of the latter space to obtain Lp spaces, approximation by polynomials

(570b) Measure and volume, sigma fields, Borel measure, convergence theorems, product measures, Fubini's theorem. Bounded variation and Riesz's theorem. The Hilbert space, L2, integration by parts, Sobolev spaces, convolution, Fourier series, Fourier reansform, compact and self adjoint operators, spectral theory, differential operators, Frechet differentiation in Banach spaces.

PREREQUISITES: A knowledge of Linear Algebra and Calculus
Text: **Linear Operator Theory in Engineering and Science by Naylor & Sell**

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