Methods of Applied Mathematics

MATH 570a

This course is marked TBA or To Be Arranged. If you have interest in taking the course email the instructor as soon as possible. "Late Breaking News" can be found on the course web page—see below.
Classrooms are extremely scarce so it is imperative that you register early and provide your schedule to me so I can pick a time that suits all and reserve a room.

Text: Linear Operator Theory in Science and Engineering, by
A. W. Naylor and G. R. Sell

The techniques of this course provide a powerful framework for analyzing infinite dimensional problems arising in virtually every modeling problem in Applied Mathematics and the Physical Sciences in the broadest sense. The course is intended to serve primarily students of the Applied Sciences: Economics, Engineering, Physics and Applied Mathematics Majors.

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Course web page: http://www-bcf.usc.edu/~rsacker/M570a.html

GRADING POLICY

2 Midterm exams – 40% of grade
Homework – 35%
Final – 25%

Class Schedule

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Weeks		Chapter
1 - 3	Metric spaces, subspaces and product spaces, open and closed sets, convergence and equivalent metrics	3A
4 – 5	Countability, compactness, completeness and completions, contraction mapping theorem, integral equations	3B
6 - 7	Linear spaces, Hamel basis and dimension, function spaces, linear transformations, isometries, inverse transformations, projections, extension of linear transformations, linear functionals, hyperplanes, conjugate space,	4
8 – 9	Banach space, continuous linear transformations, spaces of linear operators, closed operators,complementary subspaces, dual spaces	5A
10 -11	Inner product and Hilbert spaces, orthonormal basis, generalized Fourier series	5B
12 -13	Continuous linear functionals, Fourier transform pair, unitary operators	5B
14 -15	Self-adjoint operators, unbounded operators, position and momentum operators, Heisenberg uncertainty principle	12 & 13