APPLIED MATHEMATICS I & II
21:640:475, 476 (3 credits, 3 credits)

COURSE DESCRIPTION:
Fourier series and integrals; boundary value problems; matrices; finite differences; special functions; numerical methods.

PREREQUISITE:
21:640:314 (Elementary Differential Equations), or permission of instructor.

IMPORTANT NOTE:
Rutgers University requires that all its students complete two writing intensive courses. Both 21:640:475 (Applied Mathematics I), and 21:640:476 (Applied Mathematics II), satisfy the writing intensive requirement for the Applied Mathematics Major.

TEXTBOOK:

DEPARTMENT WEB SITE:  http://www.ncas.rutgers.edu/math

THIS COURSE COVERS THE FOLLOWING CHAPTERS AND SECTIONS:

Chapter 5:  Series Solutions of ODE’s, Special Functions
5.1 Power Series Method
5.3 Legendre’s Equation
5.4 Frobenius Method
5.5 Bessel’s Equation

Chapter 11: Fourier Series, Integrals, and Transforms
11.1 Fourier Series
11.2 Functions of Any Period
11.3 Even and Odd Functions, Half-Range Expansions
11.5 Forced Oscillations
(Possibly topics from 11.6-11.9)
Chapter 12: Partial Differential Equations
12.1 Basic Concepts
12.2 Modeling: Vibrating String, Wave Equation
12.3 Solution by Separating Variables. Use of Fourier Series
12.4 D’Alembert’s Solution of the Wave Equation
12.5 Heat Equation: Solution by Fourier Series
(Possibly 12.6 Heat Equation: Solution by Fourier Integrals and Transforms)

Chapter 23: Graphs, Combinatorial Optimization
23.1 Graphs and Digraphs
23.2 Shortest Path Problems
23.3 Bellman’s Principle. Dijkstra’s Algorithm
23.4 Shortest Spanning Trees: Greedy Algorithm
23.5 Shortest Spanning Trees: Prim’s Algorithm
23.6 Flows in Networks

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