



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:

“Advanced Engineering Mathematics,” (10th edition) by Kreyszig, published by Wiley.

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 Shortes Spanning Trees: Prim's Algorithm

23.6 Flows in Networks

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