

FOUREIER SERIES AND BOUNDARY VALUE PROBLEMS
MATH 4330/8336

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1.0 Course Description

1.1 Overview of Content and Purpose: (3 hours) Heat conduction, vibrating membranes, boundary value problem, Sturm-liouville systems, Fourier series, Fourier integrals, Bessel functions, Legendre polynomials.

1.2 For Whom Intended:

1.3 Prerequisites: MATH 2350

2.0 Objectives

2.1 Performance Objectives for the Student: (3 hours) To introduce the student to certain problems arising in physics and engineering and provide the student with the standard mathematical techniques in Fourier series for solving such problems.

3.0 Content and Organization

3.1 Topics:

1. Physics and engineering problems giving partial differential equations which may be solved by the techniques of Fourier series.
2. Orthogonal sets of functions.
3. Boundary value problems, physical problems, solution techniques, uniqueness results.
4. Fourier integrals.
5. Special functions (scope will vary with background of the students).

4.0 Teaching Methodology

4.1 Methods to be Used: Lecture

5.0 Evaluation

5.1 Basis for Evaluating Student Performance: Grades will be based on homework and exams (three plus final)

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6.0 Resource Material

- 6.1 Textbook(s) or** Churchill, Ruel V., and Brown, James W., *Fourier Series and
Other required* *Boundary Value Problems*, 4th Ed., McGraw-Hill, 1987.
Readings: