

Math 512 Partial Differential Equations Winter Quarter, 2010

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Course Web Page:
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Grader: Ting-Hao Hsu

Lecture: Call # 14498: MWF 9:30 - 10:18 in CL (Caldwell Laboratory) 220

Text: *Partial Differential Equations w/Fourier Series & Boundary Value Problems, 2nd Edition*, Nakhlé H. Asmar, Pearson, ISBN 0131480960

Prerequisite: Mathematics 255 or 415 or equiv (with written permission of dept)

Purpose of Course: This course develops problem solving skills to handle standard partial differential equations and boundary value problems arising in engineering and physics applications. There is little emphasis on theory. Derivation of the partial differential equations from physical models is not emphasized. Students will learn to solve a variety of PDE's and ODE's and to interpret the solutions.

Topics

Examples of PDE. The linear transport equation; method of characteristics. Derivation of the Wave Equation; D'Alembert's solution for the infinite line; finite line and normal modes. Introduction to Fourier Series; Euler formulas; calculation of series; even and odd functions. Method of Separation of Variables: the Wave Equation, the Heat Equation. Two-dimensional Wave and Heat Equations; Laplace's Equation in rectangular coordinates. Laplace's equation in polar coordinates; circle and wedge geometries. Nonhomogeneous BVP for Laplace, Heat and Wave Equations. Introduction to Laplace Transforms for ODE and PDE.

Syllabus: Selected sections of Chapters 1-5 and 8 of text.

Exams/Homework: Homework will be assigned weekly and graded.
There will be two in-class tests (January 29 and February 26), and a two-hour final exam.

Final Exam Date: Wednesday, March 17, 9:30 - 11:18 am.

Grading: Grade will be based on homework, tests, and final exam.