

# Math 381: Introduction to Partial Differential Equations

Rice University, Fall 2003

## **Instructor:**

Theron J. Hitchman  
408 Herman Brown Hall  
x2372  
theron@math.rice.edu  
office hours: Tuesday and Thursday 11am-noon, and by appointment

## **Material:**

This course is an introduction to the classical parts of the theory of partial differential equations. We shall study some generalities about finding solutions to PDE, and then discuss many specific equations which are important in mathematical physics including the heat equation, the wave equation and Laplace's equation. We will encounter and study some of the important "special functions" of mathematical analysis like Bessel functions, Legendre polynomials and Chebyshev polynomials. Time permitting, we shall study some other useful techniques like the Laplace transform method.

## **Reference List:**

**Textbook:** Hildebrand, *Advanced Calculus for Applications, vol. 2*, Prentice-Hall

## **Other books of interest:**

- Arnol'd, *Ordinary Differential Equations*
- Boyce and DiPrima, *Elementary Differential Equations and Boundary Value Problems*
- Simmons, *Differential Equations with Applications and Historical Notes*
- Jackson, *Fourier Series and Orthogonal Polynomials*
- Spivak, *A Comprehensive Introduction to Differential Geometry, Vol. 5*, Chapter 10
- Churchill, *Operational Mathematics*

**Grades:** homework is 40%, two midterm exams and a final exam 20% each.

**Homework:** Homework is very important for success in this course. It is essential that you practice the skills that we discuss. Please work together on these assignments and while studying. Each student is required to turn in their own individual written homework. Problem sets will be due approximately every other week, but problems will be assigned every day in class.

**Exams:** We'll discuss these later, but I plan for two midterms and a comprehensive final exam.