Math 311: Applied Mathematics: Physical Sciences Partial Differential Equations

Professor: Dan Schult Office: 314 McGregory Phone: 7651 email: dschult Spring 2013 Office Hours: Th 9:00-11:00 Tu 1:20-2:30 and ANY time by appointment.

Textbook:

Applied Partial Differential Equations with Fourier Series and Boundary Values Problems, R. Haberman, Prentice Hall, 2004.

There are many other good books on each subject we cover and the library has many of them. You can also find good descriptions of many topics on the web.

Wegpage: http://math.colgate.edu/math311

or if you're lucky math/math311

Course Objectives: Throughout this course, you should develop a basic understanding of partial differential equations as well as a more complete understanding of ordinary differential equations, series and truncated series as approximate solutions to differential equations. You should be able to use Fourier Series and Fourier Transforms as general methods for describing functions. More specifically, we will discuss:

- 1. How the inner (dot) product applies to functions,
- 2. Orthogonality of functions,
- 3. Functions as vector spaces,
- 4. Fourier series solutions, convergence of series and truncation error,
- 5. Classification of linear PDEs,
- 6. Separation of Variables,
- 7. Fourier Transforms,
- 8. Simple Green's Functions and some Special Functions.

Course Structure:

Approximately Weekly Assignments: Homework from exercises in the book and supplemental problems will be due slightly less often than weekly. Writeups of the homework solutions should be carefully prepared documents expressing complete ideas and sentences. State the problem before you launch into a solution. Explain what methods or algorithms you will be using to solve the problem. These problems will require you to extend the material covered in the book and class. Satisfactory completion of these assignments will be crucial to success in this course. You may work together on the homework assignments, but the final writeup should be yours and yours alone.

Mid-term Exam schedule: Two mid-term Exams likely to include in–class and take home portions are tentatively scheduled for

- The week including Friday March 1, 2013
- The week including Friday April 12, 2013

Final Exam: A cumulative two-hour final exam will be given Thursday May 9 from 3-5pm.

Grades: Your grade will be determined by your work on weekly assignments (30%), mid-term exams (20% each), and the final exam (30%).