

# Math 5420, Partial Differential Equations

Spring 2007

**Instructor** – Brynja Kohler

**Classroom** – Geology 310

**Meeting time** – 10:30-11:45 Tuesday and Thursday

**My Office** – Lund Hall 220

## **Office Hours** –

My office hours will be on Wednesdays from 9-11a.m. or 1-2 p.m. If these times are inconvenient for you, feel free to make an appointment with me for another time. My office is located on the first floor of the Mathematics and Statistics Department building (Lund Hall) room 220.

## **Contacting Me** –

Feel free to contact me by email [kohler@math.usu.edu](mailto:kohler@math.usu.edu) or call my office at 797-2826.

## **Course Description** –

*From Wikipedia:* In mathematics, a partial differential equation (PDE) is a relation involving an unknown function of several independent variables and its partial derivatives with respect to those variables. Partial differential equations are used to formulate and solve problems that involve unknown functions of several variables, such as the propagation of sound or heat, electrostatics, electrodynamics, fluid flow, elasticity, or more generally any process that is distributed in space, or distributed in space and time. Completely distinct physical problems may have identical mathematical formulations.

*From the USU course catalog:* Modeling with partial differential equations, diffusion, and wave equations. Classical solution techniques including: maximum principles, separation of variables (eigenfunctions), method of characteristics, Fourier and Laplace transforms, and singularity methods (Green's Functions). Emphasizes understanding and solving physical equations. Prerequisite: Math 2250 or 2280. (3 cr) (Sp)

Course information will be posted on our course web page at

<http://www.math.usu.edu/~kohler/math5420.html>

## **Text** –

My primary source for preparing lectures and course notes will be the generously shared notes of Professor James Powell. Our primary text will be *Applied Mathematics* second edition, by J.D. Logan. We will cover chapters 4-6. We will also periodically dip into *Schaum's Outline for Partial Differential Equations* by P. Duhateau and D. Zachmann.

### Tests –

There will be a midterm test and a final examination (non-cumulative) (from 9:30 -11:20 a.m. on Tuesday, May 1). Each test will be worth 100 points.

### Homework –

Daily homework assignments will be written on the board. Homework will be collected every two weeks, generally on Fridays. Homework will be due on the designated day at 3 p.m. (in my homework box outside my office in the math department). Homework which is late will only be worth 50%; homework which is more than one week-day late will not be counted. Each homework will be worth 50 points; I will count the top six toward your homework grade.

### Grading –

Each homework counts 50 points and the top six will comprise your homework grade. Each test counts for 100 points; the final will be non-cumulative and count for 100 points. The A,B,C,D,F scale will be applied percentage-wise.

Item	Points		
Homework (6)	300		
Midterm Test	100		
Final Test	100		
Total	500		
Percentage	Grade	Percentage	Grade
94-100	A	76-79.9	C+
90-93.9	A-	73-75.9	C
86-89.9	B+	70-72.9	C-
83-85.9	B	65-69.9	D+
80-82.9	B-	60-64.9	D

### Homework Preparation –

1. All graded work must be presented on 8.5 × 11 inch paper (not torn from a loose-leaf or spiral binder). Graph paper or Engineering paper is okay, as is paper torn from notepads provided that edges do not have sloppy tears.
2. Writing should only be on one side of each paper.
3. A horizontal line drawn across a page should intersect only one problem. Work in columns from left to right and top to bottom, and align relational symbols where possible. The exceptions are graphs or diagrams, which may be displayed to the right of the written content of the work.

4. Your name, class, date, and page number should appear in the upper right corner of each sheet.
5. Obey rules of punctuation and grammar. When mathematics and words must be mixed remember that relational symbols act like verbs of being, and the right and left hand sides of a relation are considered subjects and objects. If a homework problem asks a specific question, be sure to answer that question with a complete sentence.
6. Partial credit will be given, so show your work and when in doubt put a step in or describe what you are doing. I will not give full credit for answers which simply beam down from the Enterprise without justification.
7. Algebraic and basic calculus errors will not be tolerated. While the occasional factor of two or  $\pm$  is impossible to get right all the time, basic errors in understanding and algebraic manipulations incur grading with prejudice.
8. Reports, labs, and essays require at least an introduction, body and conclusion, as well as complete sentences and appropriate punctuation. When in doubt about the structure and style of your written work, please feel free to bring it to me in office hours for constructive feedback without point deductions.
9. Graphs and tables must have appropriate labels, titles, and/or captions.
10. The work we do is way too complex to complete effectively in a disorganized fashion. Homework will be rigorously organized and ordered, with the mathematical progression of a problem indicated clearly through the use of appropriate relational symbols, spacing and formatting.
11. I will deduct points when these rules are violated.