

Introduction to Partial Differential Equations
MWF 12–12:50pm
CB343
Fall 2005

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Office Hours: MWF1-2pm
and by appointment.

Grading: Grades will be based on homework a mid-term exam and a final. The homework will be worth 50 points, and each of the exams will be worth 25 points. Collaboration will be encouraged on the homework. The mid-term exam will have a take-home component. You may only ask assistance from your instructor on the take-home portion of the exam.

Text: *Partial Differential Equations, Craig Evans*

The course will serve as an introduction to the rigorous mathematical theory of partial differential equations. The first semester will concentrate learning about several basic examples, first order equations, Laplace's equation, the heat equation and the wave equation. Students will begin to learn about the properties of solutions of these equations in order to develop intuition as to what results hold for generalizations of these equations. The second semester will concentrate on the modern theory of elliptic equations, equations which generalize Laplace's equation. The course will also review (introduce?) many facts from advanced calculus as they are needed.

I expect to cover the bulk of Chapters 1–4 this fall. We will concentrate on the material in Chapter 2 and pick and choose topics from Chapters 3 and 4.

Homework: Homework will be assigned and collected regularly. You should endeavor to write out your homework clearly. Use complete sentences. Refer to facts from the text by giving page or result numbers. Note that homework is a substantial fraction of your grade.

Be aware that your instructor is old and cranky. Late homework will not be accepted. You may only write on one side of a paper. Leave generous margins. I may use the margins and the back of each sheet for comments. You may also find that your instructor is a bit distracted. Please ask if you do not understand my comments. You may write your homework out by hand.

A portion of your homework grade may be based on presentations of homework problems that students give in class.

A number of other textbooks cover the material of this course. Three¹ of my favorites are:

- Micahel Taylor, *Partial Differential Equations vol. 1-4*.
- Fritz John, *Partial Differential Equations*.

¹There two kinds of mathematicians, those who know how to count and those who don't.

- G.B. Folland, *Introduction to Partial Differential Equations*.
- David Logan, *Applied Partial Differential Equations (Undergraduate Texts in Mathematics)*.
- H.F. Weinberger, *A First Course in Partial Differential Equations With Complex Variables and Transform Methods*.

Approximate Schedule:

Chapter 1, Introduction	24 August–14 September.
Chapter 2, Four basic equations	16 September–21 October
Midterm exam	24 October
Chapter 3, Nonlinear first order partial differential equations	26 October–16 November
Chapter 4, Representation of solutions	18 November–9 December.
August 12, 2005	