MA483
MWF2:00-2:50pm
CB345
Spring 2001

Instructor: Russell Brown
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Office hours: MWF11–12
and by appointment.

Grading: Grades will be based on homework (30%), one longer project (10%), a midterm exam (25%) and a final (35%). I expect that an A on homework will correspond to roughly 90%, a B to 80%, a C to 70%, and a D to 60%.

Text: *Partial differential equations, an introduction*, Walter Strauss, John Wiley 1992.
This course will be an introduction to partial differential equations with a view to applications. We will try to explain where partial differential equations arise in science and engineering and basic properties and topics in harmonic analysis, as time permits.
We will cover chapters 1–5 of Strauss and parts of chapters 7 and 8. I hope to have time to cover topics of interest to the students. Please let me know if there is anything that you are interested in studying (or presenting!).

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 numbers 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.

Project: In addition to the written homework, each student will be asked to prepare a paper related to partial differential equations. For graduate students from other disciplines, I would like you to find one application of pde's in your discipline. Describe the problem and indicate in so far as possible, the mathematics needed and what questions you can answer. Undergraduates in mathematics will be asked to write out an exposition of a topic related to, but not directly covered by the course. Please see me if you have questions, or need suggestions. The project will be due at the end of the semester. I expect that projects will range from 3-10 pages. More guidance will be given after the first exam.

Other sources: Below is a list of other books that you may want to look at.

- Methods of mathematical physics volumes I and II, by R. Courant and D. Hilbert. This is a classic book, though probably more advanced than Strauss.
- Partial differential equations, 4th edition, Fritz John. (Fritz John was an assistant professor at the University of Kentucky from 1935–1942.) Another book at a higher level than Strauss.
- Industrial Mathematics a Course in Solving Real-World Problems : A Course in Solving Real-World Problems, Avner Friedman and Walter Littman. This is a text aimed at illustrating applications of mathematics.

- A first course in partial differential equations with complex variables and transform methods. H. Weinberger. A classic text aimed at roughly the same audience as Strauss.
- Applied Partial Differential Equations, J. David Logan. This text is at about the same level as Strauss.
- Introduction to Partial Differential Equations : A Computational Approach, Aslak Tveito, et al. This is a more recent treatment which includes a little bit more about computational methods than the other books on this list.
- Introduction to partial differential equations with MATLAB, Jeffery Cooper. Another book with more emphasis on computationi.