Mathematics 4348a Introduction to Partial Differential Equations II Spring, 2000

Class times: MWF 1, Skiles 149 (room uncertain)
Instructor: Evans Harrell, Skiles 134, tel. 894-4312, e-mail harrell@math.gatech.edu
Office periods: MF2:30-3:30.

Texts: The on-line text, *Linear Methods of Applied Mathematics*, with parts of the text by Zachmanoglou and Thoe.

Prerequisites: Ordinary differential equations at the level of Mathematics 3308. Math 4347 is suggested but not necessary.

Grading, structure, and requirements. Monday and Wednesday will be lecture days, and Fridays will be a mixture of lectures, problem sessions, and computational work. Thus on Fridays homework will be due, and in addition there may be a quiz, which counts. There will be scheduled exams on **Friday, 28 January**, **Friday, 18 February**, **Friday, 17 March**, and **Friday, 7 April**. (Calendar).

Goals: After taking this class, you should understand the following.

The Fredholm alternative theorem for solving matrix equations.

- The concepts of *linearity* and *operators* and their relationship to differential equations.
- How to solve integral equations of the form Y = K Y + f, where K is an integral operator
- *Differential operators and their adjoints*, and their uses.
- The concept of a *Green function* and its use to solve ordinary differential equations.
- The use of *Green functions* to solve partial differential equations.
- The use of high-level software (Maple, Mathematica, or Matlab) as a tool for solving these problems.

We shall rapidly review some concepts from linear algebra and ordinary differential equations before proceeding towards these goals.

Computer and network use.

High-level software will often be used for calculations in this course, and this will allow us to progress further than was possible in the past. They will not be required, however, and students will be able to do the entire course with paper calculations, if they so desire.

contact me.

Onward to the text.

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MATH 4348, PARTIAL DIFFERENTIAL EQUATIONS II
COURSE SYLLABUS
SPRING 2007

INSTRUCTOR: ANDRZEJ SWIECH
LECTURES: TR 12:05-13:25 pm, SKILES 254
OFFICE: SKILES 235B
OFFICE HOURS: TR 11:00-12:00
PHONE: (404) 894-2705
E-MAIL: swiech@math.gatech.edu

TEXTBOOK: E. C. Zachmanoglou and D. W. Thoe, *Introduction to Partial Differential Equations with Applications*

MATERIAL TO BE COVERED AND COURSE OBJECTIVES: The course is a continuation of Math 4347. Its main focus is on equations of elliptic and parabolic types and their primary examples, Laplace's and the Heat equations. We will learn various ways to solve these equations and study their qualitative and quantitative properties. In particular we will study Green's functions and fundamental solutions.

As the course progresses I will be assigning homework problems, mostly from the textbook. They will not be collected. A separate homework assignment will be given. I will try to assign enough problems so that you can determine what part of the material you have mastered and what you still need to work on.

GRADING: There will be three tests (February 6, March 6, and April 10), one homework assignment (due on April 19), and the final exam. Each test and the homework assignment will count for 16% of the final grade, and the final exam will count for 36%. Your grade will be based on how well you can solve problems and compute using the theory. You will not be asked to reproduce proofs. To get an A, respectively B,C, and D, your final score will have to be greater than 85%, respectively 70%, 55%, and 40%. Improvement will be taken into account in assigning final grades.

Please be aware of the Georgia Tech Honor Code and follow it carefully. In particular please make sure that all the work you submit is your own.

Math 4348 Partial Differential Equation II. Spring 2008

Schedule: 3:05 pm - 4:25 pm MW	Classroom: Skiles 246
Office: Skiles 102A	Phone: 404-894-4750
Email: zengch@math.gatech.edu	Webpage: **www.math.gatech.edu/~zengch**
Office hours: 10am - 12 pm W	

Syllabus

Instructor: Chongchun Zeng

Prerequisites: **MATH 2403** and **MATH 2406** or permission of the instructor

Participation: Attendence in classes is mandatory. Students are expected to read the materials before and/or after the classes. It is suggested that you start to work on homework problems right after they are assigned.

Text book: Introductions to PDEs with Applications by E. C. Zachmanoglou and D. W. Thoe, Dover Publications, 1986.

Topics: In this semester, we shall discuss basic first and second order PDEs and their applications.

- Laplace's equation
- The heat equation
- The wave equation
- System of Conservation Laws
- Nonlinear PDEs

Grades: **1 final exam 55%, 1 midterm 33%, 6 homework assignments 12%.**

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- *Exams:* The final will be 2 hours and 50 minutes. The 80-minute midterm will be given during a lecture in the second half of Feb., which will be announced at least 9 days in advance. The students may use the textbook and the notes of this course in the midterm and final exams. Please write your exam solutions in **ink** and **circle** the final answer of each problem in a box with no corrections inside. Writing exams in pencil would automatically forfeit your right to argue for credits after the exam is given back to you. There will be **no** make-up for a missed exam, except under provable impossibility to attend the exam.
- *Homework:* Homework will be assigned at the end of each lecture and then put on this webpage in the below. You may discuss the homework problems with other students *in this class*, but you should write down the solutions and complete the homework independently. The homework will be collected roughly every 2 weeks. On each collecting day, the homework is due in the classroom at the beginning of the lecture. The corresponding assignment includes all the problems assigned before that collecting day and after the previous assignments. Some selected problems from each assignment will be graded and the score will be given based on both the graded problems and the completion of the whole assignment. Due to the holiday schedules, the specific homework collecting dates are:

  1/16(Wed), 2/6(Wed), 2/20(Wed), 3/5(Wed), 3/26(Wed), 4/9(Wed)

- *Letter grade:* in general, the letter grade will be given based on the total score (homework + midterm + final) in a curved fashion with the following exceptions:

1. Total score 90/100 or above will always be an **A**
2. Total score 60/100 or above will always be a **C** or higher.

Homework assignments:

- Homework Assignment #1 (due Wed, 1/16):
  - Page 173. 1.3, 1.4
  - Page 178. 2.4, 2.7

- Page 178. 2.4, 2.7
- Page 186. 3.4, 3.5

- Homework Assignment #2 (due Wed, 2/6)
  - Page 196. 5.1, 5.2, 5.7
  - Page 205. 7.3, 7.4, 7.5, 7.7(b)
  - Page 221. 8.5, 8.9, 8.10(b)(c)
- Homework Assignment #3 (due Wed. 2/20)
  - Page 226. 9.1, 9.2
  - Page 231. 10.3
  - Page 235. 11.3
  - Page 239. 12.8, 12.9
- Homework Assignment #4 (due Wed. 3/5)
  - Page 244. 13.2, 13.4
  - Page 248. 14.2, 14.3
  - Page 259. 16.1, 16.4
- Homework Assignment #5 (due Wed. 3/26)
  - Page 270. 1.1, 1.3, 1.5, 1.7, 1.10
  - Page 273. 2.1, 2.2
  - Page 279. 3.4
- Homework Assignment #5 (due Wed. 4/9)
  - Page 283. 4.1, 4.3, 4.7
  - Page 290. 5.1, 5.4
  - Page 298. 6.2, 6.5, 6.6
- Homework not to be handed in:
  - Page 307. 7.1, 7.6
  - Page 316. 8.3, 8.4, 8.5
  - Page 328. 10.1, 10.2, 10.7