

Course Syllabus: **APPM 4350/5350** **Fall 2009**

Methods in Applied Mathematics–Fourier Series and Boundary Value Problems (BVP's)

Instructor:

M.J. Ablowitz (mark.ablowitz@colorado.edu) off. ECCR 255; ph. 2-5502; Off hours: MWF 2-3pm or by appointment; Class room: ECCR 151

Text:

Applied Partial Differential Equations by R. Haberman, Pearson/Prentice Hall, Fourth Edition, 2004.

There will be bi-weekly homework assignments. Two exams will be given in the evening. Expected dates/times for eve exams: Tues Oct. 13, 5:30-7:00pm; Wed Dec. 9, 5:00-7:00pm Both are expected to be in room: ECCR 1B40

You MUST do the HW regularly. Doing and understanding the HW is extremely important in this class. The HW is due every two weeks. They are challenging. DO NOT WAIT UNTIL THE LAST MINUTE!!

A written report and talk will be required on a topic relevant to the course. The talk will be approximately 15 minutes plus 5 minutes for questions in groups of no more than three students registering for APPM 4350 (in this case a 5 minute talk for each student) and no more than two students registering for APPM 5350. By Oct. 9 a one page description of the topic/group you will study will be required. Topics will be available to choose from or you can choose a topic, which must be approved by the instructor. Expected dates/rooms/times for the project talks will be eves: Mon-Tues (Nov. 16-17) 5-10pm: ECCR 15; Wed (Nov. 18) 5-10pm: ECCR 131; Thurs (Nov. 19) 5-10pm: ECCR 155; if nec: Fri 4-8pm (Nov. 20): ROOM: ECCR 150 A list of possible or potential topics will be distributed in a few weeks. Detailed schedules will be decided later in the course.

Grade determination: exams: 50% homework: 25% final report and lecture: 25% The instructor reserves the right to modify grade distribution if it is clear that a student has not worked with sufficient independence.

Help sessions with TAs: Wednesday (MUEN E432) and Thursday: 6-8pm (ECCR 1B51).

Teaching Assistants:

- A. M. Lieb <Anna.Lieb@colorado.edu> ,
- C. Long <Connor.Long@colorado.edu@colorado.edu> ,
- G. C. Peterson <Geoffrey.Peterson@colorado.edu>
- D. Baldwin <douglasbaldwin@douglasbaldwin.com>

Topics to be covered –time periods are approximate:

1. Introduction; review; physical discussion of the heat equation (Ch 1-1 week).
2. Method of separation of variables–1-dimension (Ch. 2-2 weeks).
3. Fourier Series (Ch. 3-2 weeks).
4. Applications (Ch. 4-1 week).
5. Generalized Sturm-Liouville Boundary Value Problems (BVP's; Ch. 5- 3 weeks).
6. Multi-dimensional BVP's (Ch. 7- 4 weeks)
7. Non-homogeneous problems; BVP's in infinite space: Fourier Transforms (Ch. 8,10-2 weeks)