

# Math 412 - Spring 2006

## Fourier Series and Partial Differential Equations

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Web page: www.math.psu.edu/mazzucat/math412  
Office hours (tentative): Wednesday 1:30 - 3:00 PM

Class meets TTh 9:45 - 11:00 AM in 15 Tyson.

**Course Description:** Orthogonal systems and Fourier series; derivation and classification of partial differential equations; eigenvalue function method and its applications; additional topics.

**Prerequisites:** You MUST have completed Math 230 or 231 AND Math250 or 251 to register.

**Textbook (required):** Nakhlé Asmar, *Partial Differential Equations and Boundary Value Problems*, Second Edition, Prentice Hall.

**Topics:** We will study the three basic partial differential equations: the Laplace, heat, and wave equations, and different techniques to solve them. In particular, we will study Fourier series, the Fourier and Laplace transforms. We will cover Chapters 1 - 3, Sections 4.1, 4.2, 4.4 - 4.6, 6.1, 6.2, 6.4, parts of Chapter 7, Sections 8.1 - 8.3. If there is additional time, we will discuss additional topics from Chapter 4, 5, and 6. We will use the material from Math 231 and 251. You may need to review it.

**Comments:** The course is challenging and you MUST devote to it adequate time and attention, by coming to class regularly, keeping up with reading and homework assignments, taking advantage of office hours. If you fall behind, DO NOT WAIT. Come to office hours immediately to get extra help.

I expect that you read the textbook carefully after each class periods. In fact, it is best to read the book before coming to class. I welcome questions both during and outside class. ALL questions are very useful to both the instructor and the students. I also welcome general feedback about the course. An anonymous feedback form is available on the course web page.

**Assignments.** There will be weekly homework, consisting of problems usually taken from the textbook. Homework will not be collected. Instead, roughly every two weeks, on Thursday, you will be asked to work out in class a problem from the homework.

There will be one midterm, and a comprehensive final exam. Homework assignments and handouts will also be posted on the course web page.

The midterm is tentatively set for the week March 13 - 17.

**Grading:**

- HOMEWORK: 30 %;
- MIDTERM: 30 %;
- FINAL: 40 %.

Grades will be based on a 10-point scale (for example, %90 =A, %80=B). The final grade may be curved.

**Policies:** Collaborations on homework problems is allowed and encouraged. NO collaboration is allowed during in-class tests.

NO LATE HOMEWORK will be accepted and there will be NO MAKE-UP EXAMS, unless for documented and valid reasons, such as illness. Your lowest homework score will be dropped.

**Academic Integrity:** "Academic dishonesty includes, but is no limited to, cheating, plagiarizing, . . ., facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with academic work of other students. . . . A student charged with academic dishonesty will be given oral or written notice of the charge by the instructor. If students believe that they have been falsely accused, they should seek redress through informal discussions with the instructor, the department head, dean or campus executive officer. If the instructor believes that the infraction is sufficiently serious to warrant the referral of the case to Judicial Affairs, or if the instructor will award a final grade of F in the course because of the infraction, the student and instructor will be afforded formal due process procedures." From Policies and Rules, Student Guide to the University Policy 49-20.

Based on the University's Faculty Senate Policy 49-20, a range of academic sanctions may be taken against a student who engages in academic dishonesty.