Math 312 Section 500 Spring 1994

# Topics in Applied Mathematics II

In this course we will study boundary value problems for three fundamental partial differential equations of mathematical physics: the wave equation, the heat equation, and the potential equation (Laplace's equation). Fourier series turn out to be a key tool in solving such equations. We will also consider some other systems of orthogonal functions, such as Bessel functions and Legendre functions.

We will cover parts of Chapters 1–5 of *Boundary Value Problems*, third edition, by David L. Powers (Harcourt Brace Jovanovich, 1987), and of Chapters 1–2 of *Fourier Series* by Georgi P. Tolstov (Dover, 1962). These books are the required textbooks. The prerequisite for this course is Math 308.

The class meets Monday, Wednesday, and Friday in HRBB 232 from 12:40 P.M.–1:30 P.M.

**Instructor**: Dr. Harold P. Boas

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**Office Hours**: 11:00 A.M.–12:00 NOON, Monday, Wednesday, and Friday; and by appointment

**Exams**: The three major exams will be given on Wednesday 16 February, Friday 25 March, and Wednesday 20 April. The comprehensive final exam is scheduled by the registrar for 10:30 A.M.–12:30 P.M., Monday 9 May.

**Grading**: The three major exams, the final exam, and the homework will each count for 20% of the course grade. Final letter grades will be based on the standard scale: you need an average of 90 for an A, 80 for a B, 70 for a C, 60 for a D.

## Course Outline

| *Week of:* | *Monday* | *Wednesday* | *Friday* |
|---|---|---|---|
| Jan 17 | Powers 2.1 | Powers 2.2 | Powers 2.3 |
| Jan 24 | Powers 2.4 | Tolstov 1.5, 1.6 | Tolstov 1.7, 1.8 |
| Jan 31 | Tolstov 1.9, 1.10 | Tolstov 1.11, 1.12 | Tolstov 1.13 |
| Feb 7 | Tolstov 1.14 | Tolstov 1.15 | Powers 1.5, 1.6 |
| Feb 14 | review | **Exam 1** | Powers 2.6, 2.7 |
| Feb 21 | Powers 2.7, 2.8 | Powers 2.10 | Powers 2.11 |
| Feb 28 | Powers 1.9 | Powers 1.10 | Powers 3.1, 3.2 |
| Mar 7 | Powers 3.2, 3.3 | Powers 3.4 | Powers 3.5 |
| Mar 14 | spring break | spring break | spring break |
| Mar 21 | Powers 3.6 | review | **Exam 2** |
| Mar 28 | Powers 4.1 | Powers 4.2 | Powers 4.3 |
| Apr 4 | Powers 4.4 | Powers 5.4 | Powers 5.5 |
| Apr 11 | Powers 5.7 | Powers 5.9 | Powers 5.9 |
| Apr 18 | review | **Exam 3** | Tolstov 2.1, 2.2 |
| Apr 25 | Tolstov 2.3 | Tolstov 2.4, 2.5 | Tolstov 2.6, 2.7 |
| May 2 | review | review | |