

Topics in Applied Mathematics II

About the course 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 course is Math 308 (Differential Equations).

The class meets Tuesday and Thursday in ACAD 225 from 15:55 to 17:10.

About the instructor Dr. Harold P. Boas (email: boas@math.tamu.edu).

Office: 322 Milner Hall (telephone: 409-845-7269).

Office hours: 14:00–15:00 on Monday, Wednesday, and Thursday; and by appointment.

Exams The three major exams will be given on Tuesday 11 February, Thursday 20 March, and Tuesday 15 April. The comprehensive final exam is scheduled by the registrar for 13:00–15:00 on Tuesday, May 6.

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. Class participation is encouraged and will count positively in borderline cases.

Course Outline

Tue Jan 14	ice day	Tue Mar 11	spring break
Thu Jan 16	Powers 2.1, 2.2	Thu Mar 13	spring break
Tue Jan 21	Powers 2.3, 2.4	Tue Mar 18	Powers 3.6, 3.7
Thu Jan 23	Tolstov 1.5, 1.6	Thu Mar 20	Exam 2
Tue Jan 28	Tolstov 1.7, 1.8	Tue Mar 25	Powers 4.1, 4.2
Thu Jan 30	Tolstov 1.9–1.11	Thu Mar 27	Powers 4.3, 4.4
Tue Feb 4	Tolstov 1.11–1.13	Tue Apr 1	Powers 5.4, 5.5
Thu Feb 6	Tolstov 1.14, 1.15	Thu Apr 3	Powers 5.6, 5.7
Tue Feb 11	Exam 1	Tue Apr 8	Powers 5.9, 5.10
Thu Feb 13	Powers 2.6, 2.7	Thu Apr 10	catch-up, review
Tue Feb 18	Powers 2.8, 2.9	Tue Apr 15	Exam 3
Thu Feb 20	Powers 2.10–2.12	Thu Apr 17	Tolstov 2.1–2.3
Tue Feb 25	Powers 1.9, 1.10	Tue Apr 22	Tolstov 2.4, 2.5
Thu Feb 27	Powers 3.1, 3.2	Thu Apr 24	Tolstov 2.6, 2.7
Tue Mar 4	Powers 3.3, 3.4	Tue Apr 29	redefined day
Thu Mar 6	Powers 3.5, 3.6	Tue May 6	Final Exam