Math 454: Boundary Value Problems
Spring 2019, University of Michigan

Instructor: Deniz Bilman, bilman@umich.edu, http://www-personal.umich.edu/~bilman
Office Hours: Tu 12–2 PM, W 12–1 PM, in 1830 East Hall

Course Meeting Times
Math 454 meets TWF 10:00–11:50 AM in 2866 EH

Textbooks

Prerequisites
Math 216, 256, 286, or 316. (Permission required after credit earned in Math 354 or 450.)

Course Description & Goals
This course is an upper-level undergrad/beginning grad level introduction to Partial Differential Equations and Boundary Value Problems. We will cover material including but not limited to the topics mentioned below. This course is designed to emphasize computation and applications. We will cover many theoretical aspects of this subject and cover proofs of theorems in class, but my main goal is to provide a working understanding of the subject matter that will prepare students for real world problems they may encounter in the future.

Topics
A tentative list of topics to cover are (the indicated chapters are from the textbook by Pinsky):
- Chapter 0: PDEs, Separation of Variables, Orthogonal Functions (Entire Chapter 0. Read Chapter A.1)
- Chapter 1: Fourier Series (Sections 1.1, 1.2, 1.4–1.6)
- Chapter 2: Boundary Value Problems in Rectangular Coordinates (Sections 2.1, 2.2, 2.4, 2.5)
- Chapter 3: Boundary Value Problems in Cylindrical Coordinates (Sections 3.1–3.3)
- Chapter 4: Boundary Value Problems in Spherical Coordinates (Sections 4.1–4.3)
- Chapter 5: Fourier Transforms and Applications (Sections 5.1–5.3)

Exams
There will be one in-class midterm exam and one final exam. The midterm exam will be in class (110 minutes) and the final exam will last 2 hours.

- Midterm Exam: Friday May 31, 2019, in class

The exam dates are absolutely firm. Travel plans will not be considered a sufficient excuse to take an examination on a different date. The final exam will be cumulative, with an emphasis on more recent material. The date of the Final Exam is determined by the Registrar’s Office.

Canvas Website
There is a Canvas site for the course: https://umich.instructure.com/courses/290031
Please verify by Friday, May 10 that you are able to access this site. Assignments and grades for the assignments will be distributed through this site.

Attendance Policy
It is highly recommended that you come to class, however I don’t take attendance. If you miss class, try to get notes from a friend. You are responsible for the information given in any announcements made during class.
**Grading**

Course work will be weighted according to the following percentages:

| homework assignments: 25% | midterm exam: 35% | final exam: 40% |

**Homework**

You are strongly encouraged to type your solutions using \TeX/LaTeX. If you cannot type them, please write your solutions neatly and show all your work. A rule of thumb can be: “If you wouldn’t feel comfortable about handing your homework assignment to your future boss, then it is not ready for submission in this class either.”

**Reading the Book**

You are expected to read the relevant sections in the text as we cover material in class. While I will try to cover as much material as possible during class, there will always be a lot that I cannot get to. Reading the book (including the proofs of theorems) will greatly solidify your understanding.

**Academic Integrity**

According to the LSA Community Standards of Academic Integrity, the College prohibits all forms of academic dishonesty and misconduct. Academic dishonesty may be understood as any action or attempted action that may result in creating an unfair academic advantage for oneself or an unfair academic advantage or disadvantage for any other member or members of the academic community. Do not cheat. If you cheat in this class, you risk failing the course. If you have any questions about what is, or is not, allowed in this course, please ask.

**Disabilities and Conflicts**

Any student with a documented disability should contact me as soon as possible so that we can discuss arrangements to fit your needs. In particular, a Verified Individualized Services and Accommodations (VISA) form must be provided to me at least two weeks prior to the need for a test accommodation. The Services for Students with Disabilities (SSD) Office (G664 Haven Hall; http://ssd.umich.edu/) issues VISA forms.

**Students with conflicts or special exam-taking requirements should contact me via e-mail, with appropriate documentation if applicable, by Wednesday, May 15.**

**Advice for Students**

Questions are highly encouraged — if something is unclear during class, please ask, ask, ask, ask. Review your the notes after each class and make a list of points that are unclear. Ask me about these points either in class or office hours. Do not postpone understanding something.

Try to focus less on your course grade and focus on learning the subject. Ask me anything to help you understand the subject better.

Ann Arbor, May 2019