Math 422/522, Partial Differential Equations: Fourier Analysis II, Spring 2009

Class Time:	MWF 10-10:50a.m. in 209 Deady Hall
Instructor:	Dr. Marcin Bownik
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Office:	334 Fenton
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Office Hours:	11-12 Mon., Wed., Fri., or by appointment
Textbook:	*Introduction to Partial Differential Equations with Applications,* by E.C. Zachmanoglou and D.W. Thoe. (Dover Publications, Inc.)

1. **Background and Goals.** This is the second term of a two term course. Standard processes in nature such as propagation of heat, diffusion through a porous solid, vibrating strings, membranes, and solids, lead to certain differential equations involving one to three spatial variables and one time variable. In the above examples, these equations are known as the "heat equation" and the "wave equation" though there are many versions of these equations depending on the details of the situation. Typically in applications, one might be interested in the solutions to these equations, subject to conditions at the boundary of the object under consideration. An example is the equation of a vibrating string (a version of the wave equation), subject to the constraint that the endpoints of the string remain fixed in place. The goal of this course is to learn how to solve such equations subject to constraints at the boundary of some region. Because so many physical phenomena are governed by equations like this, considerable effort has gone in to developing techniques of solution. This term will focus on the Laplace and Poisson equations, applications of Green's functions, the mean value property and the max-min principle.

2. **Exams.** There will be a midterm in-class exam on Wed. of week 6 and a final exam.

3. **Homework.** Homework problems will be assigned every week and are due in class on Wednesday on the material of the previous week. No late homework will be accepted.

4. **Grading.** The grading distribution will be as follows:

Homework:	25%
Midterm Exam:	25%
Final Exam:	50%