APMA 2230: PARTIAL DIFFERENTIAL EQUATIONS I

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Lectures: MWF, 10:00–10:50, Barus & Holley 161.

Office hours: MW, 11:00–12:00.

Textbook: L.C. Evans "Partial differential equations", AMS, Graduate Studies in Mathematics, V. 19.

Supplementary books:
- D. Gilbarg, N.S. Trudinger, "Elliptic partial differential equations of second order", Springer-Verlag, Berlin, 2001.
- N.V. Krylov, "Lectures on elliptic and parabolic equations in Hölder spaces", AMS, Providence, RI, 1996.
- N.V. Krylov, "Lectures on elliptic and parabolic equations in Sobolev spaces", AMS, Providence, RI, 2008.
- F. John, "Partial Differential Equations" (Applied Mathematical Sciences), Springer, 4th edition (November 20, 1991).

Prerequisite: Basic knowledge of real and functional analysis (Lebesgue integral, Banach and Hilbert spaces).

Outline of the course: This course serves as an introduction to the theory of partial differential equations. I will take materials from the textbook, the supplementary books and my notes.

In the Fall semester, we will cover the basic properties of different types of equations, with a more detailed account on second order elliptic and parabolic equations including the maximum principle, the Harnack inequality, Hölder regularity of solutions, etc.

In the Spring semester, we plan to study equations in Sobolev spaces, variational methods, hyperbolic equations and systems, and some nonlinear equations if time permitted.

Grades: There will be a take-home final exam, and a few homeworks will be assigned during the course. The final grade will be based on them (Final exam 30%, Homeworks 70%).

On October 16 I will be out of town. I will find someone to substitute on that day.