

SPRING 2018  
COURSE ANNOUNCEMENT

Math 8584: Theory of Partial Differential Equations  
MWF 10:10 AM - 11:00 PM, VinH 209

**Instructor:** Mikhail Safonov, VinH 231  
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**Office Hours:** MWF 11:15 - 12:05 AM, or by appointment

This is a continuation of the course Math 8583, Fall 2017, by Professor Calder.

In this semester, we plan (tentatively) to cover the following subjects.

1. Properties of solutions of second order elliptic equations in *non-divergence* and *divergence* forms, such as: Hölder regularity of solutions, different versions of the Harnack inequality, boundary estimates, etc.
2. Second order elliptic equations with Hölder coefficients
3. Elliptic and parabolic equations with continuous coefficient and solutions in Sobolev spaces (Calderon-Zygmund type theory).
4. If time permits, elliptic and parabolic fully nonlinear equations (nonlinear with respect to the second derivatives.)

Lecture notes will be provided for the main part of the course.

**PREREQUISITES:** Some knowledge of Real and Functional Analysis (Lebesgue integral, Banach and Hilbert spaces).

For supplementary reading, one can use the books:

**L. C. Evans**, *Partial Differential Equations*, Graduate Studies in Mathematics, Vol. 19, 1998 (or later edition).

**N. V. Krylov**, *Lectures on Elliptic and Parabolic Equations in Hölder spaces*, Graduate Studies in Mathematics, Vol. 12, 1996.

**D. Gilbarg and N.S. Trudinger**, *Elliptic Partial Differential Equations of Second Order*, Springer, 2nd Edition, 1983 (or more recent 3rd Edition).

**EVALUATION.** In Spring semester, the grade will be based on 4 best (out of 5) homeworks (40%) which will be due before the spring break, an in-class open book Midterm exam (20%) on Wednesday, March 7, and a take-home Final homework (40%).