

Math 428: Honors Topics in Mathematics (CRN 48286)
Topic: An Introduction to Fourier Analysis and Wavelets
Spring 2016

Instructor: Florin P. Boca
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Lectures: MWF 11:00-11:50 am, 7 Illini Hall
Office Hours: Monday 4-5 pm, Thursday 3-4 pm

Course description: This is the capstone course in the Mathematics Honors Sequence. As part of the honors sequence, this course will be rigorous and abstract, providing a rigorous treatment of Fourier theory on the unit circle, the real line, and on finite Abelian groups, with applications to the study of wavelets. The main topics will include:

- Fourier series and summability;
- The discrete Fourier and Haar transforms;
- The Fourier transform, Schwartz spaces, Fourier inversion, Plancherel's theorem, distributions;
- Wavelet and multiresolution analysis.

This course should be of interest to students in mathematics, physics, and engineering.

Prerequisite: Math 416 and either Math 424 or Math 447. Department approval requires. Restricted to undergraduates - Urbana-Champaign.

Textbook: The textbook "Harmonic Analysis. From Fourier to Wavelets" by Maria Cristina Pereyra and Lesley A. Ward (Student Mathematical Library, Vol. 63, American Mathematical Society, 2012) is recommended and will be used as main reference. Additional resources are going to be used.

Grading: The final grade will be based on homework (15%), class attendance (5%), two midterm exams (30%), final exam (30%), and a final term project (20%).