

Topics in Harmonic Analysis - Math 542

Spring 2018

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- **Office hours:** *To be announced on the course website*

- **Web page:** The course website is

<http://www.math.ubc.ca/~malabika/teaching/ubc/spring18/math542/index.html>

All relevant course information will be posted here.

- **Lectures:** Tuesday and Thursday 12:30 pm - 2:00 pm in Mathematics 203.
- **Pre-requisite:** Introductory analysis sequence (consisting of Math 507, 508, 510, 541) or equivalent. A working knowledge of Fourier transform, convolution, Plancherel theorem, Fourier inversion, Schwartz functions, and tempered distributions will be assumed.
- **Course outline:** Harmonic analysis is a vibrant area of modern analysis, that draws upon and contributes to a wide variety of mathematical fields such as additive combinatorics, geometric measure theory and partial differential equations. The purpose of this course is to introduce some core topics in harmonic analysis, explain their connections with surrounding areas and give a glimpse of some recent breakthroughs. Here is a selection of material that we hope to expand upon:
 - Polynomial method
 - Dimensionality issues in geometric measure theory
 - Fourier restriction and Kakeya problems: linear and multilinear settings
 - Decoupling estimates

Apart from graduate students in harmonic analysis, this course should be of interest to those intending to specialize in discrete mathematics, number theory, PDE, probability, mathematical physics, applied harmonic analysis and inverse problems.

- **Grading Policy:** The student's course grade will be equally distributed between
 - (a) a singly-authored term paper (minimum 5 pages) and
 - (b) 1-2 oral presentations,

on topics agreed upon by the student and the instructor. Group projects are also welcome subject to these guidelines. An initial proposal for the material for (a) and (b) is expected by the week of February 26. Further details will appear on the course webpage closer to that date.