

Fourier analysis, fall 2016

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Teacher: [Eero Saksman](#)

Scope: 10 cr

Type: Advanced studies

Teaching: (FIRST LECTURE IS ON MONDAY 12.9!) Lectures on weeks 37-41 and 44-50, in room C123, on Mondays, 10-12, Tuesdays 12-14 and on Wednesdays 9-12.

Topics: The course is an introduction to modern Fourier Analysis. Fourier analysis is a basic tool both in pure and applied mathematics, from PDE's and harmonic analysis to stochastics, signal processing, physics,...

The first part of the course, roughly weeks 36-42, covers discrete Fourier analysis (Fourier series and also Fast Fourier transform), while the second period, weeks 44-50, studies the continuous Fourier analysis, i.e. Fourier transforms of functions and (Schwartz) distributions in \mathcal{R}^d . Throughout the course, and time allowing, many of the applications of Fourier analysis are discussed.

Prerequisites: Basic knowledge on measure theory and Lebesgue integration (e.g. the course "Mitta ja integraali") is required. Knowledge of basics of L^p -spaces will be advantageous (e.g. as discussed in the course Reaalianalyysi I; see below). In addition some facts from functional analysis will be used - if necessary, these can be briefly discussed during the course (especially, one does not assume the course in functional analysis)

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News

- **Lectures have ended, thanks for participation!**
- Last exercise class Friday 2.12
- Review problems class Wednesday 7.12 9-12 C123
- **Exam** Friday 9.12 at 9-13 in C124

Teaching schedule

Weeks 37-41 and 44-50, Monday 10-12, Tuesday 12-14 and Wednesday 9-12 in room C123.

Exams

Final exam Friday 9.12 at 9-13 in C124. In any cases you can get a considerable amount of extra points from the exercises you have solved for the exercise class.

You can use (lecturer will fill in) in the exam.

Course material

Basic material consists of the lectures, which will appear in the net along the course. For those who are interested in extra reading, some books will be recommended in the lectures.

[Lecture notes so far](#)

Registration

Did you forget to register? [What to do?](#)

Exercises

The exercise classes are directed by Olli Hirviniemi (olli.hirviniemi@helsinki.fi), and they take place on Fridays 10-12 in room C322. First class is on Friday 23.9.

Assignments

- [Set 1 \(23.9\) solutions](#)
 - [Set 2 \(30.9\) solutions](#)
 - [Set 3 \(7.10\) solutions](#)
 - [Set 4 \(14.10\) solutions](#)
 - [Set 5 \(21.10\) solutions](#)
 - [Set 6 \(11.11\) solutions](#)
 - [Set 7 \(18.11\) solutions](#)
 - [Set 8 \(25.11\) solutions](#)
 - [Set 9 \(2.12\) solutions](#)
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- [Review exercises \(7.12\) solutions](#)

Exercise classes

Group	Day	Time	Room	Instructor
	Friday	10-12	C322	Olli Hirviniemi

Course feedback

Course feedback can be given at any point during the course. Click [here](#).