

Metric geometry, fall 2013

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Lecturer

[Ilkka Holopainen](#)

Scope

10 cu

Type

Advanced studies

Description

Metric geometry and analysis on metric spaces are nowadays very popular research topics. The purpose of this course is to introduce some basic notions of metric geometry (like various notions of curvature and boundaries of metric spaces), methods, and results.

Prerequisites

Basic and intermediate studies.

Knowledge on Topology II, Real Analysis I, Introduction to Differential Geometry, and Riemannian Geometry would be useful but not necessary.

Lectures

Weeks 36-49, Tuesday 12-14 in room B322, and Thursday 14-16 in room C123. **Note:** The last lecture is on Thursday, December 5.

Exams

The course can be passed by an [exam](#) or by solving home work problems and writing an essay.

Content (tentative)

- Metric spaces, in particular length spaces
- Model spaces
- Alexandrov-spaces
- Non-positively curved metric spaces
- Metric spaces with curvature bounded from below
- CAT()-spaces
- The Cartan-Hadamard theorem
- Gromov-Hausdorff convergence
- Gromov-hyperbolic metric spaces

Bibliography

- M. Bridson, A. Haefliger: Metric Spaces of Non-Positive Curvature, Springer, 1999.
- D. Burago, Y. Burago, S. Ivanov: A Course in Metric Geometry, American Mathematical Society, 2001.
- Gromov: Metric Structures for Riemannian and Non-Riemannian Spaces, Birkhäuser, 1999.

Lecture notes: I. Holopainen: [Metric Geometry](#).

Registration

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

Exercises

Group	Day	Time	Place	Instructor
1.	Wednesday	14-16	B322	Juhani Koivisto

Home work assignments and solutions

[Exercise 1 Solutions 1](#)

[Exercise 2 Solutions 2](#)

[Exercise 3 Solutions 3](#)

[Exercise 4 Solutions 4](#)

[Exercise 5 Solutions 5](#)

[Exercise 6 Solutions 6](#)

[Exercise 7 Solutions 7](#)

[Exercise 8 Solutions 8](#)

[Exercise 9 Solutions 9](#)

[Exercises 10 Solutions 10](#)