

MATH-323

**Topology III - Homology**

Monin Leonid

Cursus	Sem.	Type
Mathematics	BA6	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Written
Workload	150h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Lecture	2 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Summary**

Homology is one of the most important tools to study topological spaces and it plays an important role in many fields of mathematics. The aim of this course is to introduce this notion, understand its properties and learn how to compute it. There will be many examples and applications.

**Content**

- CW complexes
- Simplicial and singular homology
- Exact sequences and excision
- Mayer-Vietoris sequence
- Eilenberg-Steenrod axioms
- Cellular homology
- Cohomology

**Keywords**

Homology, cohomology, cell complexes

**Learning Prerequisites****Required courses**

- Metric and topological spaces
- Topology

**Learning Outcomes**

By the end of the course, the student must be able to:

- Define the main concepts introduced in the course
- State the theorems covered in the course and give the main ideas of their proofs
- Apply the results covered in the course to examples
- Compute the homology groups of CW complexes

- Prove easy topological facts
- Express topological arguments

### Teaching methods

lectures, exercise classes

### Expected student activities

Attending the course, homework assignments, participating actively in the course and the exercise

### Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

### Resources

#### Moodle Link

- <https://go.epfl.ch/MATH-323>