

Topologie II WiSe 14/15

Winter Term 2014/2015

Welcome to the course website! This course on algebraic topology is taught by [Pavle Blagojevi](#) and [Holger Reich](#) and is a continuation of Topologie I. Although it is helpful to have taken Topologie I, it is not necessary.

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Second Written Exam

Here are the [results](#) of the second written exam. If there are questions, please come by Albert's office on Tuesday at 4PM.

Course Description

We understand this course as a comprehensive beginners course in algebraic topology. Although it is helpful to have taken Topologie I to follow the present course, it is not necessary. The aim of Topologie II is for you to thoroughly understand and be able to apply all notions of homology and cohomology, the cup and cross product, as well as some results on duality (for instance Poincaré duality). The course will roughly be structured as follows (as time permits):

- Categories and functors, chain complexes
- Singular homology, chain homotopy
- Mayer-Vietoris Sequence, Jordan Curve Theorem
- Reduced homology, relative homology, Alexander's theorem
- Simplicial homology
- Degrees, Euler characteristic, Lefschetz number, Lefschetz fixed point theorem
- CW complexes
- Cellular homology
- Eilenberg–Steenrod axioms
- Künneth Theorem
- Universal Coefficient Theorem
- Singular cohomology, simplicial cohomology
- Cup product
- Cross product, topological manifolds
- Poincaré Duality
- Alexander Duality
- Manifolds with boundary

We recommend the books by J. Munkres ("Elements of Algebraic Topology", Addison-Wesley 1984) and A. Hatcher ("Algebraic Topology", Cambridge U Press 2002, also online) and the succinct lecture notes by J. P. May ("A Concise Course in Algebraic Topology", online).

Contact

Contact			Office Hours:
Lecture	Pavle Blagojevi and Holger Reich	blagojevic(at)math.fu-berlin.de , holger.reich(at)fu-berlin.de	TBA
Tutorial	Albert Haase	a.haase(at)fu-berlin.de	Mon 13-14, 002, Arnimallee 2

Lectures

Lectures		
Wed	10:15 - 11:45	HS 001, Arnimallee 3
	12:15 - 13:45	SR 031, Arnimallee 6

Tutorials and Problems

Tutorials		
Mon	14:15 - 15:45	SR 031, Arnimallee 6

In the tutorial, we will learn some things that will help us better understand the lecture, expand on topics from class, and occasionally review exercises.

Every now and then a sheet will appear on this website containing exercises, some of which we highly recommend. Do the other exercises if they seem challenging enough or if you don't have an idea of how to solve them immediately. Solutions to select exercises will appear on this website. In order to encourage you to solve exercises, we will (1) periodically ask students to present solutions to an exercise in the tutorial and (2) base parts of the exam on the exercises.

Course requirements are the following: (1) You must actively participate in the course. (2) You must pass an exam at the end of the semester which alone will determine your grade. The first written exam will take place on March 3 from 2-4 PM in "Großer Hörsaal Informatikgebäude Takustraße 9". The second written exam will take place on April 13 from 10AM - 12PM in "Seminarraum Arnimallee 2".

- [Hatcher: Idea of Homology](#)

Exercise Sheets

- [Sheet 1 \(Oct 15\)](#), [Sheet 1 Sol](#)
- [Sheet 2 \(Oct 27\)](#), [Sheet 2 Sol](#)
- [Sheet 3 \(Nov 17\)](#), [Sheet 3 Sol](#)
- [Sheet 4 \(Nov 26\)](#), [Sheet 4 Sol](#)
- [Sheet 5 \(Nov 28\)](#),
- [Sheet 6 \(Dec 22\)](#),
- [Sheet 7 \(Jan 26\)](#)
- [Sheet 8 \(Feb 3\)](#)
- [Revision \(Feb 22\)](#)