



DEPARTMENT OF MATHEMATICAL SCIENCES

NFMV010 Algebraic topology, 7.5 credits

Algebraisk topologi, 7,5 högskolepoäng

Third-cycle level / Forskarnivå

Confirmation

This syllabus was confirmed by the Department of Mathematical Sciences on 2019-10-28, and is valid from Autumn semester 2019.

Responsible Department

Department of Mathematical Sciences, Faculty of Science

Entry requirements

Familiarity with topological spaces, covering spaces and the fundamental group will be assumed, as well as comfort with the structure of finitely generated modules over a PID. This material is covered in, for example, the following courses:

MMG500: Algebraic structures

MMA100: Topology

MMA300: Commutative algebra (preferable but not essential)

Learning outcomes

After completion of the course the Ph.D. student is expected to master the fundamental definitions, and to understand and be able to use the basic results and tools of algebraic topology.

Course content

A main idea in algebraic topology is to consider two spaces as equivalent if they have the same "shape". This course develops the basic tools of singular homology and cohomology for topological spaces to this end. Topics include: singular homology, CW complexes, homological algebra, cohomology and Poincaré duality of topological manifolds.

Types of instruction

2 x 2 hour lectures per week during the third quarter.

Language of instruction

The course is given in English.

Grades

The grade Pass (G) or Fail (U) is given in this course.

Types of assessment

There will be three problem sets during the course and a final 40-minute oral exam during the final exam week. The Ph.D. student gets one hour to prepare a short presentation of a randomly chosen topic from a list of nine for the oral exam, during which the examiner may ask questions about details and connections to other topics in the course. The assignments will be chosen from the exercises in the textbook.

Standard Disclaimer:

A Ph.D. student who has failed a test twice has the right to change examiners, if it is possible. A written application should be sent to the Director of Graduate Studies.

In cases where a course has been discontinued or major changes have been made, a Ph.D. student should be guaranteed at least three examination occasions (including the ordinarily scheduled exam) during a period of at least one year from the last time the course was given.

Course evaluation

The course evaluation is carried out together with the Ph.D. students at the end of the course, and is followed by an individual, anonymous survey. The results and possible changes in the course will be shared with the students who participated in the evaluation and to those who are beginning the course.