FSF3630 Algebraic Topology 7.5 credits

Algebraisk topologi

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FSF3630 valid from Autumn 2016

Grading scale

Education cycle

Third cycle

Specific prerequisites

A Master degree including at least 30 university credits (hp) in in Mathematics.

Familiarity with basic algebraic topology as for instance covered by the course SF2735/MM8020 Homological Algebra and Algebraic Topology.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After completion of the course the student should:

- Have a god understand the basic principles of homotopy theory and applications of topology and other areas of mathematics
- Be able to follow current research literature
- Be able to, if desired, pursue research projects in this area

Course contents

- Definition of homotopy groups, basic properties
- Whitehead's theorem, CW approximation.
- Blakers-Massey theorem, Freudenthal's suspension theorem, stable homotopy groups, Hurewicz's theorem
- Eilenberg–Mac Lane spaces, cohomology, computation of cohomology rings
- Generalized cohomology theories, Brown representability
- Cohomology operations and the Steenrod algebra
- Either:

    - Vector bundles, K-theory and its spectrum

    - Adams operations

    - Hopf invariant 1

- Or:

    - Smooth manifolds

    - Transversality, Thom isomorphism

    - Thom-Pontryagin construction and bordism, Thom spectra

    - Classification of manifolds up to bordism

Disposition

Lectures, homework and reading.

Course literature

- Allen Hatcher, Algebraic topology, Cambridge University Press, 2001
- Tammo tom Dieck, Algebraic topology, EMS Textbooks in Mathematics, EMS Publishing House, 2010

- Glen E. Bredon, Topology and geometry, Springer Graduate Texts in Mathematics 139, 1997
- J. Peter May, A concise course in algebraic topology, University of Chicago Press, 1999

In addition, some original papers may be used.

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Homework.

Other requirements for final grade

Approved homework assignments.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.