SF2735 Homological Algebra and Algebraic Topology 7.5 credits

Homologisk algebra och 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 SF2735 valid from Autumn 2009

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mathematics

Specific prerequisites

120 university credits (hp) including the course "Groups and rings" (SF2729) or corresponding course, and documented proficiency in English corresponding to English B.

Language of instruction

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

Intended learning outcomes

The aim of the course is to discuss basics of homological algebra and topology and illustrate how one can use one to understand the other. The focus will be on the construction of homology for both chain complexes and topological spaces. The aim is to develop methods used for calculations and learn how to interpret the answer.

Course contents

1. Homological algebra: homomorphisms, kernels cokernels, exact sequences and complexes, Snake lemma, functorial properties of Hom(A,B) and the tensor product, Tor and Ext groups, Universal Coefficient Theorem.
2. Topology: euclidian and projective spaces, singular homology and its properties, fundamental group, applications: Brouwer fix point theorem and non-vanishing vector fields on spheres.

Equipment

The lectures will be based on the provided notes.
Additional books:
Greenberg,"Lectures on Algebraic topology"
Rotman; "A course in homological algebra"

Examination

- TEN1 - Examination, 7.5 credits, grading scale: A, B, C, D, E, FX, F

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.

Other requirements for final grade

Written examn/home assignments (where slash means and/or, all depending on what we decide to do at a much later stage.)

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.