FMVE010 Algebraic Topology, 7.5 HE credits

Course period
January 20 – March 201, 2020.

Course Meeting Times
Lectures: 2 sessions / week, 2 hours / session during study period 3 (2020).

Last day for application
January 20, 2020.

Course leader / Address for applications
Jan Alve Svensson / janalve@chalmers.se

Course description (Advertisement for Ph.D. students)
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 singular homology and cohomolgy of topological spaces to this end. Topics include: Singular homology, CW complexes, Homological algebra, Cohomology, and Poincaré duality of topological mainifolds.

Responsible department and other participation departments/organisations
Department of Mathematical Sciences

Teacher
Jan Alve Svensson

Examiner
Jan Alve Svensson

Course syllabus for
FMVE010 Algebraic Topology, 7.5 HE credits

1. Confirmation
The syllabus was confirmed by the Head of the Department of XXX 200X-XX-XX, 200X-XX- XX.

Disciplinary domain: Science
Department in charge: Department of Mathematical Sciences
Main field of study: Mathematics.

2. Position in the educational system
Elective course; third-cycle education

3. 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 is covered in the courses MMG500 Algebraic Structures, MMA100/FMVE055 Topology (and preferably MMA330 Commutative Algebra).

4. Course content
This is a course on the singular homology and cohomolgy of topological spaces. Topics include: Singular homology, CW complexes, Homological algebra, Cohomology, and Poincaré duality of topological mainifolds.

5. 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 basic results and tools of Algebraic Topology.

6. Literature
Hatcher, Allen. Algebraic Topology. Cambridge University Press, 2001. ISBN: 9780521791601. Also available on-line at
https://pi.math.cornell.edu/ hatcher/AT/AT.pdf

7. Assessment
There will be three problem sets during the course and a final 40 minute oral exam during 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 with other topics in the course. The assignments will be chosen from the exercises in the textbook.

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 Department.

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

8. Grading scale
The grading scale comprises Fail, (U), Pass (G).

9. 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.

10. Language of instruction
The language of instruction is English.