



FSF3610 Analysis in Several Complex Variables 9.0 credits

Analys i flera komplexa variabler

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 FSF3610 valid from Autumn 2015

Grading scale

Education cycle

Third cycle

Specific prerequisites

The course is aimed towards students at a graduate level, in particular, PhD students in mathematical analysis. A good understanding of the basic theory of analysis in one complex variable is required, as is background in general mathematical analysis such as measure theory, differential geometry and functional analysis.

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 students should:

- Have a good understanding of basic concepts in the theory of several complex variables
- Be familiar with the language of complex geometry
- Be familiar enough with more advanced concepts to be able to independently read and understand current research in the field
- Have an idea of the focus of current research in the field

Course contents

We will mainly follow Hörmander's book *Complex Analysis in Several Variables*, the lecture notes by Bo Berndtsson entitled *An Introduction to Things $\bar{\partial}$* , and the lecture notes *An Introduction to Weighted Pluripotential Theory* by Norm Levenberg.

Basic topics:

- Domains of holomorphy
- Pseudoconvexity
- Reinhardt Domains
- Polynomial approximation and Runge Domains
- Hörmander's $\bar{\partial}$ estimates
- Stein Manifolds

Advanced topics:

- Elements of Complex Geometry
- Complex Monge-Ampere Equation
- Weighted pluripotential theory, Monge-Ampere Measures
- Bergman Kernel Asymptotics

Disposition

The course is a reading course. The participants are encouraged to work through the material independently, and regularly discuss among themselves and with the examiner.

Course literature

- *Complex Analysis in Several Variables* (3rd Edition), Lars Hörmander, North Holland (1990).
- *An Introduction to things $\bar{\partial}$* , Bo Berndtsson, online lecture notes.
- *An Introduction to Weighted Pluripotential Theory*, Norm Levenberg, online lecture notes.

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.

The students should display their proficiency in the subject during meetings with the examiner. Homework problems may be given, and should be graded and discussed by the students themselves.

Other requirements for final grade

The students should, via examination as discussed above, have demonstrated that they have reached the learning outcomes.

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.