



# SF1677 Foundations of Analysis

## 7.5 credits

### Analysens grunder

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 SF1677 valid from Spring 2019

### Grading scale

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

### Education cycle

First cycle

### Main field of study

Technology

### Specific prerequisites

SF1673 Calculus in One Variable and SF1674 Multivariable Calculus, or corresponding courses.

Preferably also basic knowledge in SF1691 Complex Analysis and SF1683 Differential Equations and Transforms, or corresponding courses.

## Language of instruction

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

## Intended learning outcomes

The course is a fundamental course for studies in more advanced mathematics and for studies in closely related fields.

By the end of the course the student should be able to solve problems on the different topics of the course. In particular the student should be able to

- Understand and be able to apply basic topological concepts. Be able to state the theorems of Heine-Borel and Bolzano-Weierstrass.
- Understand and be able to apply the concepts of continuity, convergence and derivative for functions between metric spaces. Be able to state Arzelà-Ascoli's theorem and Weierstrass' approximation theorem.

## Course contents

- Real numbers. Metric spaces. Basic topological concepts. Convergence. Continuity. Derivative. Integral. Uniform convergence. Spaces of functions. Banach's fixed point theorem.
- Implicit and inverse mapping theorem. (Something about Lebesgue integral, alternatively something about differential forms and Stokes' theorem.)

## Course literature

- Walter Rudin, "Principles of mathematical analysis", or
- Charles Chapman Pugh, "Real mathematical analysis".

## Examination

- TEN1 - Exam, 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 exam, possibly with continuous examination (TEN1; 7.5 hp).

## 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.