



Course syllabus

Faculty of Technology

Department of Mathematics

2MA451 Matematik, vetenskap och samhälle, 7,5 högskolepoäng

Mathematics, science and society, 7.5 credits

Main field of study

Mathematics

Subject Group

Mathematics

Level of classification

First Level

Progression

G2F

Date of Ratification

Approved 2014-10-03

Revised 2016-06-15 by Faculty of Technology.

The course syllabus is valid from autumn semester 2016

Prerequisites

Courses comprising 60 credits mathematics, mathematical didactics, computer science or physics, of which at least 45 credits mathematics out of which at least 7.5 credits from the G2F level, plus the course 1MA411 Mathematical Modeling I or equivalent.

Objectives

After completion of the course the student is expected to be able to:

- Outline some scientific methods in science, engineering, social sciences and the humanities
- Outline the axiomatic-deductive method and discuss its limits
- Discuss ethical problems in mathematics and its applications
- Master basic mathematical writing and reference management
- Present mathematical arguments in written form and orally, using presentation tools (e.g. Beamer), and adapt the presentation to the audience
- Reflect upon the mathematician's role in society
- Reason on entrepreneurship, innovation processes and development in mathematics and its applications
- Be familiar with some current mathematical research questions and how they are presented in seminars
- Identify methods in some current research projects

Content

Philosophy of science and mathematics

- Scientific methods in science, engineering, social sciences and the humanities
- The axiomatic-deductive method and its limitations
- The meaning of applied mathematics
- Ethics for mathematicians Mathematical communication
- Report writing and reference management
- Mathematical writing (formulas in text, structure, theorems, definitions, etc)
- Presentation techniques and popular science writing
- Latex

The role of mathematics and the mathematician in society

- The role of the mathematician in society is discussed at seminars and exemplified by study visits
- The professional role of the mathematician is illuminated by visits or external lecturers
- Entrepreneurship for mathematicians: Lectures and seminars introduce entrepreneurship, especially presumptions for entrepreneurship for mathematics and its applications. Innovation, idea development and commercialization are discussed based on case studies.

A glimpse at mathematical research

- Contacts with current research in the form of participation on adapted seminars at the department.

Type of Instruction

Lectures, seminars and tutoring

Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

The section on philosophy of science is examined by means of an oral inquiry.

The section on mathematical communication is examined with a written assignment and an oral presentation. The oral presentation takes the form of a role play where students are assigned mathematical presentations for various types of fictitious audiences (e.g. students or employers without training in mathematics).

The section on entrepreneurship is examined by a written reflection report.

The active participation in the research seminars is examined by an assessment of oral communication and a written summary of the content.

Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

Credit Overlap

This course cannot be part of a degree in combination with another course in which the content fully or partly correspond to the content of this course: 2MA151 Mathematics, science and society, 7.5 credits

Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

Required Reading and Additional Study Material

Philosophy of Science - A contemporary introduction, Alex Rosenberg, Routledge, third edition or later, 2011

Suna Lowe Nielsen, Kim Klyver, Majbritt Rostgaard Evald and Torben Bager (2012) Entrepreneurship in Theory and Practice : Paradoxes in Play Edward Elgar Publishing Ltd (236 s)

Handbook of writing for the mathematical sciences, N. J. Hogham. SIAM latest edition 300(120).

The not so short introduction to LaTeX, T. Oetiker et al.
(<http://tobi.oetiker.ch/lshort/lshort.pdf>)

Ethical guidelines, American Mathematical Society, (<http://www.ams.org/about-us/governance/policy-statements/sec-ethics>)

Franco Vivaldi, Mathematical Writing, Springer, 2014