# Mathematics (16-30cr)

Programme course

15 credits

Matematik (16-30hp)

91MA21

Valid from:

**Determined by**
The Board of Educational Science

**Date determined**
2012-01-09

# Main field of study
Mathematics

# Course level
First cycle

# Advancement level
G1X

# Course offered for
- Secondary School Teacher Programme with a specialization in Teaching in the Upper-Secondary School, subject Internationell Mathematics
- Secondary School Teacher Programme with a specialization in Teaching in the Upper-Secondary School, subject Mathematics

# Entry requirements
Admission Requirements For admission to the course specific entry 6c and Sh B and completed courses General Education, 5 credits, Development and Learning, 10 credits, skills assessment and grading, 7.5 hp, education history, the school's role in society and values, 7.5 hp and Mathematics (1-15 credits) , 15 credits, or equivalent.

# Intended learning outcomes

Aim of the Course

After completing the course, students will be able to
- Read and interpret mathematical texts in calculus
- Formulate and explain basic concepts, laws and theorems in one variable calculus
- Solve problems in variable analysis by applying key concepts, theorems and methods
- Perform standard calculations
- Use of laboratory and technical facilities in Mathematics, including symbolic computation software
- Describe the didactic aspects of key concepts, operations, theorems and methods of analysis
- Based on current curricula to describe and analyze the goals and content of school mathematics and relate these to theoretical representations of mathematical concepts and methods
- Describe and compare different ways of looking at the concept of knowledge in mathematics as a discipline and as a subject
- Discuss students' perceptions of and ways to acquire basic mathematical concepts and skills in the theory of functions and algebra
- Present results from relevant school mathematics education research

# Course content

Contents

Studies and analysis of functions of one real variable. The subject content is as follows: Limits and continuity. Differential calculus and function studies. Primitive functions, Riemann integral, comparison between sums and integrals, applications of integrals: area of flat surfaces, length of curves, volumes of solids of revolution, area of surfaces of revolution, center of gravity. Taylor and Maclaurin formulas, Maclaurin expansion of elementary functions, various forms of the residual term, applications such the error estimation by approximations and calculation of limits. Ordinary differential equations: first-order linear and separable equations, linear equations of higher order with constant coefficients. Integral equations. Improper integrals: convergence study, absolute convergence. Numerical series: convergence study, absolute convergence, Leibniz criterion. Power Series.

Beginning with basic definitions and properties of elementary functions, using logical reasoning and evidence and skills training in the form of both exercises and theoretical reasoning, the students work on solving tasks, choose the appropriate solution once, examine and explain mathematical relationships, as well as illustrate and present solutions.

Students also work with symbolic processing software.

Students discuss mathematics as a scientific discipline and as a subject linked to. Mathematics in school and society. Objectives and content of school mathematics based on existing curricula.

Theories of some theoretical perspectives on knowledge and learning in mathematics are treated. Student conducts didactic analysis included in the course school relevant mathematical concepts and methods, focusing on multiple representations and explanations. Students problematize the relationship between mathematics in school and in the community.

# Teaching and working methods

Teaching

Lectures, seminars, group work, laboratory work and independent study

# Examination

Examination

The course is assessed by written examinations and written presentations.

EXAM CODES
STN1 Written exam: written examinations Calculus part 1, 6 credits (U, G, VG)
STN2 Written exam: written examinations Calculus part 2, 6 credits (U, G, VG)
SRE1 Written presentation: Didactics report, 3 credits (U, G)

# Grades

Three-grade scale, U, G, VG

# Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus. The course is carried out in such a way that both men´s and women´s experience and knowledge is made visible and developed.

# Department

Matematiska institutionen