Mathematics (31-45)

Programme course

15 credits

Matematik (31-45 hp)

93MA31

Valid from:

Determined by
The Board of Educational Science

Date determined
2013-04-15

Revision date
2014-04-15

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 Biology
- Secondary School Teacher Programme with a specialization in Teaching in the Upper-Secondary School, subject English
- Secondary School Teacher Programme with a specialization in Teaching in the Upper-Secondary School, subject History
- 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 Internationell Social Studies
- Secondary School Teacher Programme with a specialization in Teaching in the Upper-Secondary School, subject Mathematics
- Secondary School Teacher Programme with a specialization in Teaching in the Upper-Secondary School, subject Social Studies

Entry requirements
Specific entry 6c and Ma D and participated in General Education, 5 credits, Development and Learning, 10 credits, skills assessment and grading, 7.5 credits, education history, the school's role in society and values, 7.5 credits and participated in 91MA11 Mathematics (1 – 15 credits) and 91MA21 Mathematics (16-30 credits) or equivalent, and other subject (1-60 credits).

Intended learning outcomes

After completing the course, students will be able to
- Formulate and explain basic concepts, laws and theorems in linear algebra, probability and statistics
- Demonstrate basic skills in calculus, problem solving and applications of linear algebra, probability and statistics through the application of its central concepts, theorems and methods
- With good safety perform standard calculations in linear algebra, probability and statistics
- Use statistical software
- Describe the historical development of mathematics and discuss its role in society from an international perspective and a gender perspective, and give examples of how this can be addressed in the teaching of mathematics in schools

Course content

The course covers basic linear algebra and statistics, namely: Vector geometry, scalar and vector products, lines and planes in different representations, quadratic curves, quadratic surfaces. Matrices and linear transformations. Determinants, area and volume change. Simultaneous equations, least-squares method. Bases and base changes. Eigenvalues and eigenvectors, spectral theorem, diagonalization, recursive effects, quadratic forms. Basic probability theory with sample space, events and the probability concept. Random variables and their properties in the form of probability distributions, expected value, variance, covariance and correlation. Special treatment of normal distribution and binomial distribution. Descriptive statistics and index calculations are discussed. Uncertainty of parameter estimation is illustrated via confidence intervals. Approximate linear relationships is studied in regression analysis. Statistical surveys and statistics in school. Use of statistical software.

Beginning with basic definitions and theorems by reasoning, evidence and skills training as well as theoretical reasoning exercises, students work on solving tasks, choose the appropriate solution once, examine and explain mathematical relationships, as well illustrate and present solutions.

Additionally, the course covers the history of mathematics with a focus on the development of key mathematical ideas, concepts and methods. The course also highlights the role of mathematics in society from different perspectives and how it and the historical development can be treated in school education.

Teaching and working methods

Lectures, seminars, laboratory work, literature studies and independent studies.

Examination

The course is assessed through a written exam and a written and oral presentations.

EXAM CODES
STN1 Written exam: written examination Linear Algebra, 6 credits
STN2 Written exam: written examination Statistics, 6 credits
STN3 Written exam: written examination History of Mathematics, 2 credits
MRE1 Oral presentation: History of Mathematics, 1 credits

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