Mathematical Analysis

Matematisk analys
15 credits

Programme course

764G07

Valid from: 2024 Spring semester

Determined by	**Main field of study**	
The Quality Board at the Faculty of Arts and Sciences	No main field of study	
Date determined	**Course level**	**Progressive specialisation**
2010-06-17	First cycle	G1N
Revised by	**Disciplinary domain**	
Course and Programme Syllabus Board at the Faculty of Arts and Sciences	Natural sciences	
Revision date	**Subject group**	
2023-04-04	Mathematics	
Offered first time	**Offered for the last time**	
Autumn semester 2010		
Department	**Replaced by**	
Matematiska institutionen		

Course offered for

- Bachelor´s Programme in Statistics and Data Analysis

Entry requirements

General entry requirements for undergraduate studies
and
Social Studies, English and Mathematics corresponding to the level in Swedish upper secondary education (Samhällskunskap 1b or 1a1 and 1a2, Engelska 6, Matematik 3b/3c or Matematik C)

Intended learning outcomes

On completion of the course, the student should be able to

- read and interpret mathematical text
- use and explain definitions of important concepts and theorems in the course
- use arithmetical rules for limits, derivatives, primitive functions and integrals for functions in one variable
- analyse functions in one variable and draw conclusions about the properties of functions
- use standard techniques to determine primitive functions and definite integrals
- give expressions for and calculate geometric quantities
- use certain concepts of multivariable analysis

Course content

The course contains:

- One variable calculus:

- Algebraic operations. Equations. Inequalities. Absolute value.

- Real and complex numbers. The Binomial theorem. Functions of one real variable.

- Polynomials. Exponential and logarithmic functions. Trigonometric functions.

- Limits. Derivative and continuity. Derivation rules. Properties of continuous functions. Extreme value. Largest and smallest value.

- Function studies. Primitive function. Integration with geometric applications such as area, arc length, area of rotation, volume of rotation. Generalised integrals.

- Taylor's formula. Maclaurin expansion of elementary functions with application to limit calculations.

- Differential equations of the first order.

- Control of results and partial results

- Multivariable analysis:

- Graphical interpretation of functions in two variables. Partial derivatives. Stationary points. Double integrals. Variable exchanges

Teaching and working methods

The teaching takes the form of lectures and teaching sessions. The students should also study independently.

Examination

The course is examined via two written examinations. Detailed information can be found in the study guide.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

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 conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.