LINKÖPINGS UNIVERSITET

Mathematical Analysis

Matematisk analys
15 credits

Single subject and programme course

764G07

Valid from:

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	G1F
Revised by	**Disciplinary domain**	
	Natural sciences	
Revision date	**Subject group**	
	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 or 3c)
- At least 37 ECTS credits passed from semester 1 and 2 Bachelor´s
  Programme in Statistics and Data Analysis

Intended learning outcomes

On completion of the course, the student should be able to
- read and interpret mathematical text
- use definitions of central concepts and central approaches
- 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
- draw expressions for, and calculate, geometric quantities
- solve the differential equations of the 1st order
- use Taylor expansions to approximate functions with polynomial
- perform convergence studies of generalised integrals (one variable calculus)
- use certain concepts of multivariable analysis.

Course content

One variable calculus: Algebraic operations. Equations. Differences. Absolute
value. Actual and complex numbers. Binomial theorem. Functions of an actual
variable. Polynomial. Exponential and logarithm functions. Trigonometric
functions. Limit. Derivative and continuity. Derivation rules. Properties of
continuous functions. Extreme value. Largest and smallest value. Function study.
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.

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.

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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.