Calculus in One Variable II

Programme course

6 credits

Envariabelanalys II

TNIU23

Valid from: 2017 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2017-01-25

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G1X

Course offered for
- Civil Engineering, B Sc in Engineering
- Civic Logistics
- Air Transportation and Logistics

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Calculus part 1

Intended learning outcomes
The student should after the course be able to:

1. define, descirbe and combine basic analytical notions like indefinite- and definite integrals, Maclaurin- and Taylorpolynomials, differential equations,
2. understand the content of most relevant theorems of analysis (like main theorem of analysis, main theorem of integral calculus, Taylor theorem),
3. understand the ideas of proofs of some of these theorems,
4. calculate integrals of various functions by an appropriate choice of integration method
5. apply integral calculus for calculations of various geometric quantities (like area of figures or volume of three-dimensional objects) by choosing suitable methods,
6. apply integral calculus for calculations of various features (like expecte value, standard deviation or quantiles) of one-dimensional continuous stochastic variables,
7. approximate functions with Maclaurin- or Taylorpolynomials,
8. handle some simple differential equations and apply them for mathematical modelling of simple systems.

Course content
Primitive functions and basic integration methods. Definite integrals and main theorem of analysis. Geomtric applications of integral calculus. Application of integrals in statistics: evaluations of expected value, standard deviation and quantiles for continous stochastic variables. Approximation of functions through Maclaurin- and Taylorexpansions. Differential equations: first order separable and linear differential equations and linear differential equations of second order.

Teaching and working methods
The course is given in a series of lectures and tutorials and is examined by a written exam TEN1. A bonus-point system based on an optional written test is applied.

Examination

KTR1	Optional written test	0 credits	U, G
TEN1	Written examination	6 credits	U, 3, 4, 5

Grades
Four-grade scale, LiU, U, 3, 4, 5

Department
Institutionen för teknik och naturvetenskap

Director of Studies or equivalent
George Baravdish

Examiner
Peter Holgersson

Course website and other links
www.itn.liu.se/~krzma

Education components
Preliminary scheduled hours: 70 h
Recommended self-study hours: 90 h

Course literature

Göran Forsling, Mats Neymark, ”Matematisk analys. En variabel”. Förlaget: Liber AB, ISBN: 978-91-47-10023-1. Göran Forsling, ”Övningar i analys i en variabel”, Matematiska Institutionen, LiU, 2001.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.