Linnæus University

Course syllabus

Faculty of Technology
Department of Mathematics

1MA132 Analys för ingenjörer, 7,5 högskolepoäng
Calculus for engineers, 7.5 credits

Main field of study
Mathematics

Subject Group
Mathematics

Level of classification
First Level

Progression
G1F

Date of Ratification
Approved by Faculty of Technology 2014-08-26
The course syllabus is valid from spring semester 2015

Prerequisites
1MA131 Basic Mathematics for Engineers or the equivalent

Objectives
The student should be able to:

- perform computations with limits, derivatives and integrals
- interpret and use elementary functions and equations
- sketch graphs and solve extreme value problems
- perform computations with Maclaurin and Taylor expansions
- solve and apply differential equations
- use derivatives and integrals in problem solving
- describe definitions and derive relations between central concepts of the course and apply these relations to solve problems
- derive simple relations within the area of limits, derivatives and integrals
- interpret, communicate and argue using mathematic notions

Content

- Derivatives and function studies: Definition of derivative, rules for calculation, the derivatives of the elementary functions, the Mean-Value Theorem, extreme value problems, sketching the graph of a function, asymptotes.
- Taylor expansions and Taylor series with applications: Maclaurin expansions of elementary functions and limit computations, estimates of the remainder term
- Integrals: Antiderivatives, definition of integral, the Fundamental Theorem of Calculus, the Mean-Value Theorem for Integrals, integration by parts,

substitutions, integrals of rational functions, improper integrals
- Applications of integrals: Volumes, centers of mass, arc lengths, rotation areas
- Differential equations: First order linear DE, separable DE, second order linear DE with constant coefficients, applications

Type of Instruction
Teaching methods Lectures and seminars. Compulsory assignments may be given during the course.

Examination
The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).
The student's knowledge is assessed in the form of written examinations. Furthermore, continuous assessment can be used during the course. The principal assessment method for the course is determined at the beginning of the course.

On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

Course Evaluation
A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

Required Reading and Additional Study Material

Månsson J., Nordbeck P. *Endimensionell analys*, Studentlitteratur, latest edition.
185 (393) pages

Månsson J., Nordbeck P. *Övningar i endimensionell analys*, Studentlitteratur, latest edition.
119 (207) pages