Course syllabus

Endimensionell analys A3
Calculus in One Variable A3

FMAB60, 5 credits, G1 (First Cycle)

Valid for: 2023/24
Faculty: Faculty of Engineering, LTH
Decided by: PLED F/Pi
Date of Decision: 2023-04-18

General Information

Main field: Technology.
Compulsory for: BME1, M1, MD1
Language of instruction: The course will be given in Swedish

Aim

The aim of the course is to give a basic introduction to calculus in one variable. Particular emphasis is put on the role that the subject plays in applications in different areas of technology, in order to give the future engineer a good foundation for further studies in mathematics as well as in other subjects. The aim as also to develop the student's ability to solve problems, to assimilate mathematical text and to communicate mathematics.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- within the framework of the course with confidence be able to handle elementary functions of one variable, including integrals of them.
- be able to set up and solve some types of linear and separable differential equations that are important in the applications.
- be able to give a general account of and illustrate the meaning of mathematical concepts in calculus in one variable that are used to construct and study mathematical models in the applications.
- be able to account for the contents of definitions, theorems and proofs.

Competences and skills

For a passing grade the student must

- in the context of problem solving be able to demonstrate an ability to independently choose and use mathematical concepts and methods in one-dimensional analysis, and to construct and analyse simple mathematical models.
- be able to demonstrate an ability to explain mathematical reasoning in a structured and logically clear way.

Contents

The concept of primitive function. Simple integration methods: partial integration and change of variable. Partial fractions. Definition of the Riemann integral. Riemann sums. Geometric and other applications of integrals. Improper integrals. Differential equations of first order: linear and with separable variables. Linear differential equations. Solution of homogeneous and certain inhomogeneous equations. Applications. Problem solving within the above areas.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: Written test comprising theory and problem solving. Computer quizzes. ONLY STUDENTS WHO PASSED THE COMPUTER QUIZZES MAY PARTICIPATE IN THE WRITTEN TEST.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts
Code: 0121. **Name:** Written Examination.
Credits: 5. **Grading scale:** TH. **Assessment:** Written test comprising theory and problem solving. The computer quizzes must be passed before the examination.
Code: 0221. **Name:** Computer Quizzes.
Credits: 0. **Grading scale:** UG.

Admission

Assumed prior knowledge: FMAB45 Calculus in One Variable A1 and FMAB50 Calculus in One Variable A2.
The number of participants is limited to: No
The course overlaps following course/s: FMA410, FMA415, FMA645, FMAA05, FMAA01, FMAB70

Reading list

- Månsson, J. och Nordbeck, P.: Endimensionell analys. Studentlitteratur, 2011, ISBN: 9789144056104.
- Övningar i endimensionell analys. Studentlitteratur, 2018, ISBN: 9789144127187.

Contact and other information

Course coordinator: Studierektor Anders Holst, Studierektor@math.lth.se
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Course coordinator: Pelle Pettersson, Pelle.Pettersson@math.lth.se
Course homepage: https://canvas.education.lu.se/courses/20326
Further information: Calculus in One Variable is taught and examined in three different variants for the Master of Science in Engineering programmes, Track A (the courses Calculus in One Variable A1-A3), Track B (the courses Calculus in One Variable B1-B2) and Track Beta (Calculus in One Variable Beta 1 and B2), depending on the study programme. In case a student changes study programme the different tracks are considered exchangeable. Before the written retake exams it will be possible to retake the computer test or the assignment, if needed.