Mathematics 3C (STÆ3C06)
Preliminary University Studies Department
(engineering, science, business and economics)

Course description

This course offers mathematics as preparation for university level studies in engineering, science, economics and business. To start with some work will be done on first and second derivatives of functions along with maximum, minimum and point of inflexion. Rational functions are covered especially and examined. Functions of cost/s, income and profit will be introduced and various methods to calculate them will be covered. Most of the methods related to integration, measuring areas, definite integrals, integration of parts, integration by substitution and partial fraction integration will be introduced. In addition, problem solving with the use of linear optimization will be taught and the practical use of linear optimization. Furthermore, matrix calculation will be covered, determinant/s and inverse functions introduced and the application of matrix calculation in problem solving. Problems with sequences and series will be covered and the Lagrange method will be introduced to students. The engineering and science division will in addition learn how to apply proof/s by mathematical induction and the ability to calculate and apply reason to different types of problems.

Descriptive name of course:
Derivatives, integration and suitable methods for problem solving.

Prerequisites (Required preparation)
Mathematics 2A, 3A, 3B or at least 18 credits (competence level 3)

Competence level
Level 3

Credits
6

By the end of the course

The student has acquired knowledge and understanding of:

- using calculations of derivatives to locate the maximum/s and minimum/s of functions

- how cost-, income- and profit functions are used in the production of a product
- all the major rules of integration and methods
- how linear optimization is utilized to find the best solution available in for example production
- matrix calculation and how it can be used to solve up to three unknown variables
- sequences and series
- partial derivatives, multidimensional functions and the Lagrange method and proof/s by mathematical induction

The student has acquired the skill to:

- spot and detect mathematical problems from various problems
- use derivatives to find the optimal solution, whether it is a maximum or minimum
- know the relation between cost, income and profit functions
- use different methods to solve integration problems
- use different methods to solve problems, i.e. linear optimization or matrix calculation
- use different methods solving sequence and series problems
- use the second derivative test to solve multidimensional functions
- use mathematical induction methods
- work independently and in groups to solve problems that require knowledge and reasoning

Student can use the knowledge and skill which he/she has acquired to:

- understand and apply the meaning and relation of concepts in the curriculum
- write their solutions systematically, share ideas with others about them and explain their ideas and tasks, verbally or graphically
- understand the interrelation of different methods when solving mathematical problems
- use critical and creative thinking and show initiative and intuition in solving problems
- apply methodical techniques in seeking solutions to problems, i.e. setting up equations
- apply methodical techniques in seeking solutions to problems linked to known solutions in similar problems, work his/her way back from known variables or by setting up equations
- approach mathematical problems with an open and positive attitude

Course assessment:

The course is assessed in a variety of ways, there among group work, individual assignments, quizzes and a final exam that will make up part of the final grade.