Linear Algebra

Programme course

6 credits

Linjär algebra

TATA16

Valid from: 2017 Spring semester

Determined by

Board of Studies for Chemistry, Biology and Biotechnology

Date determined

2017-01-25

Main field of study

Mathematics, Applied Mathematics

Course level

First cycle

Advancement level

G1N

Course offered for

- Chemical Biology, M Sc in Engineering
- Engineering Biology, M Sc in Engineering

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.

Intended learning outcomes

To give the basic knowledge about vectors and matrices which is required for future studies in mathematics. After this course students will be able to handle the linear algebra which is used in other courses in the programme. To pass this course students will need to be able to

- work with scalar and vector products of geometric vectors
- define the concept of vector space, and calculate with vectors and coordinates
- carry out calculations with matrices
- define the concept of linear transformations, and find their matrices
- carry out calculations with determinants
- solve systems of linear equations and understand the structure of their solutions
- apply the 'least-squares' method
- apply change of basis for problem solving
- determine eigenvectors and eigenvalues, and interpret them geometrically
- formulate the spectral theorem
- determine canonical basis for quadratic form and apply that to geometric problem solving
- solve systems of linear differential equations

Course content

Geometric vectors, straight lines and planes. General vector spaces and Euclidean spaces. Scalar and vector products. Matrices. Linear transformations. Determinants. Systems of linear equations. Eigenvalues and eigenvectors. Quadratic forms. Systems of linear differential equations.

Teaching and working methods

Teaching is done through lectures and problem classes. The course runs over the entire autumn semester.

Examination

KTR1	Exercise	0 credits	U, G
TEN1	Written Examination	6 credits	U, 3, 4, 5

Grades

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

Department

Matematiska institutionen

Director of Studies or equivalent

Jesper Thorén

Examiner

Vitalji Tjatyrko

Course website and other links

http://www.mai.liu.se/und/kurser/index-amne-tm.html

Education components

Preliminary scheduled hours: 84 h
Recommended self-study hours: 76 h

Course literature

Andersson L. m fl.: Linjär algebra med geometri. Studentliteratur

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.