Linear Algebra

Programme course

6 credits

Linjär algebra

TNA002

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical
Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study

Mathematics, Applied Mathematics

Course level

First cycle

Advancement level

G1X

Course offered for

- Electronics Design Engineering, M Sc in Engineering
- Communications, Transport and Infrastructure, M Sc in Engineering
- Media Technology and Engineering, 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.

Prerequisites

Foundadtion course in mathematics

Intended learning outcomes

To give a unified framework for geometrical and algebraic techniques, with applications in analysis, mechanics, computer graphics, numerical analysis, mathematical statistics, control theory, linear optimization and other subjects. It is also included to develop the ability of using the mathematical language both written and oral. It is necessary for the participant to be able to

- solve systems of linear equations
- work with inner and cross product
- calculate with matrices and determinants
- calculate with vectors and coordinates in a vector space
- determine the matrix for a linear transformation and the kernel and the range for such matrices
- determine ON-basis in an inner product space
- do orthogonal projection on subspaces and to use least squares approximations
- solve problems by changing basis
- determine and to use eigenvalues and eigenvectors in different problems
- use the spectral theorem in different problems
- determine the canonical basis of quadratic forms and to use these to solve geometrical problems.
- carry out inspections of results and partial results, in order to verify that these are correct or reasonable
- solve system of linear ordinary differential equations

Course content

Vectors, straight lines and planes. Linear systems of equations. Matrices and determinants. Vector spaces. Euclidean spaces.
Linear mappings. Isometric and symmetric mappings. Eigenvalues and eigenvectors. Diagonalization. Otrhogonality. Quadratic forms. Distance and approximation. System of linear ordinary differential equations

Teaching and working methods

The course is given in the form of lectures and tutorials.

Examination

KTR2	Individual assignments	0 credits	D
UPG2	Individual assignment	0 credits	U, G
KTR1	Individual assignments	0 credits	D
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

George Baravdish

Course website and other links

http://www2.itn.liu.se/utbildning/kurs/

Education components

Preliminary scheduled hours: 87 h
Recommended self-study hours: 73 h

Course literature

Additional literature

Compendia

Kompendium utgivet vid ITN.

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.