Linear Algebra

Programme course

6 credits

Linjär algebra

TNIU75

Valid from:

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2017-01-25

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G1X

Course offered for
- Civil Engineering, B Sc in Engineering
- Air Transportation and Logistics, Bachelor's Programme
- Civic Logistics, Bachelor´s Programme

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
After completing this course students should be able to:
- solve systems of linear equations and be able to interpret these solutions geometrically,
- handle basic geometric objects in two and three dimensions (like points, vectors, lines, planes) and be able to investigate essential relations between these objects,
- understand the notion of a matrix and master the matrix calculus in order to perform simple matrix operations (like transposition or multiplication of matrices),
- understand and apply the notion of basis in space and perform the change of basis,
- give an account for and perform calculations with the help of basic ideas and methods of theory of linear operators including inverse operators, eigenvalues and eigenvectors, diagonalization of operators (spectral theorem) and dimension theorem as well as relate these to the methods and notions from p. 2, 3, and 4.

Course content
Systems of linear equations. Vectors. Matrices. Determinants. Bases. Change of Bases. The scalar product. The cross product. Lines and planes in space. Linear transformations and their compositions. Eigenvalues and eigenvectors of a linear transformation. Diagonalization. Spectral theorem. Kernel and image of a linear operator. Dimension theorem.

Teaching and working methods
The course consists of lectures and tutorials.

Examination

KTR1	Optional written test	0 credits	U, G
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: 52 h
Recommended self-study hours: 108 h

Course literature

Additional literature

Books

Albertson, F, *Lineär algebra med vektorgeometri, Övningsbok*
ISBN: 9789144005287
Tengstrand, A, *Lineär algebra med vektorgeometri*
ISBN: 9789144044187

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.