KURSPLAN
Linjär algebra och optimering, 7,5 högskolepoäng

Linear Algebra and Optimization, 7.5 credits

Kurskod:	TAOG19	**Utbildningsnivå:**	Grundnivå
Fastställd av:	VD 2019-06-01	**Utbildningsområde:**	Naturvetenskapliga området
Reviderad av:	2021-11-05	**Ämnesgrupp:**	MA1
Gäller fr.o.m.:	2022-01-01	**Fördjupning:**	G1N
Version:	2		

Lärandemål

After a successful course, the student shall

Kunskap och förståelse
- display knowledge of vectors, matrices and the basic operations, defined for these objects
- display knowledge of systems of linear equations, their possible solution sets, as well as how can these be formulated as matrix equations
- display knowledge of what constitutes a linear programming problem

Färdighet och förmåga
- demonstrate the ability to use Gauss elimination and basic matrix algebra to solve systems of linear equations
- demonstrate the ability to use vector operations and linear systems to solve geometrical problems in two or three dimensions
- demonstrate the ability to calculate determinants, eigenvalues of square matrices, draw conclusions about unique solvability of square linear systems, matrix singularity and linear dependence of vectors
- demonstrate the ability to formulate a real world problem as a linear programming problem
- demonstrate the ability to use graphs and the Simplex algorithm to solve limited-sized linear programming problems and to draw sensitivity conclusions from the solutions
- demonstrate the ability to formulate the dual of a linear programming problem and to draw conclusions from its solution
- demonstrate the ability to use computer software to solve linear algebraic and optimization problems

Innehåll

The course introduces several elements from the linear algebra as well as techniques for linear optimization.

The course includes the following elements:
- Systems of simultaneous linear equations and Gauss elimination

- Vectors, basic operations and some vector geometry
- Matrices and matrix algebra
- Eigenvectors and eigenvalues
- Linear programming
- Graphical solutions to two-dimensional linear programming problems
- The Simplex method and sensitivity analysis
- Duality in linear programming
- Examples of computer software for optimization.

Undervisningsformer

Lectures, seminars and computer exercises.

Undervisningen bedrivs på engelska.

Förkunskapskrav

Grundläggande behörighet samt Engelska 6, Fysik 1, Kemi 1, Matematik 3c. Eller: Engelska B, Fysik A, Kemi A, Matematik D (or the equivalent).

Examination och betyg

Kursen bedöms med betygen 5, 4, 3 eller Underkänd.

The final grade will only be issued after satisfactory completion of all assessments.

Poängregistrering av examinationen för kursen sker enligt följande system:

Examinationsmoment	Omfattning	Betyg
Skriftlig tentamen	7,5 hp	5/4/3/U

Kurslitteratur

The literature list for the course will be provided 8 weeks before the course starts.

Hardy: Linear algebra for engineers and scientists using Matlab, Pearson,
ISBN 0-13-010988-6