# UNIVERSITY OF BORÅS

## Linear Algebra
### Linear Algebra/Linjär algebra
7.5 credits

**Ladok Code:** TT0211
**Version:** 1.0
**Established by:** Board of the department 2009-04-17
**Valid from:** Autumn 2009

**Education Cycle:** First cycle
**Main Field of Study (Progressive Specialisation):**
**Disciplinary Domain:** Natural sciences
**Prerequisites:** Admitted to Industrial Engineering - Business Engineering.
**Subject Area:**
**Grading Scale:** ECTS-credits

### Content

- Linear input/output models
- Matrices and vectors
- Properties of and operations on matrices
- Linear systems of equations, properties and methods of solution
- Determinants
- Linear transformations on vector spaces
- Eigenvalues and eigenvectors
- Least square method
- Introduction to graph theory
- Applications in logistics and economics

### Learning Outcomes

This course develops the techniques and theory of elementary linear algebra needed to model and work with general linear systems in science and engineering. Selected applications of linear algebra to economics, logistics and graph theory are included. Computer based tools are used to facilitate realistic computations.

After passing the course the student should be able to:

1. Recognize systems where linear input/outpur models can be used
2. Perform elementary operations on matrices, vectors and determinants
3. Analyze and solve linear systems of equations
4. Define vector spaces and work with linear transformations on them
5. Compute eigenvalues and eigenvectors
6. Apply the general theory in relevant contexts and solve the ensuing problems

### Forms of Teaching

Lectures, exercise classes, computer laboratory work.

The language of instruction is English.

### Forms of Examination

The course will be examined through the following examination elements:

*Mathematical problemsolving using software*
Learning outcomes:
Credits: 3.5
Gradingscale: ECTS-credits

*Written examination*
Learning outcomes:
Credits: 4
Gradingscale: ECTS-credits

Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås.

## Literature and Other Teaching Materials

## Student Influence and Evaluation

The head of department and the course coordinator are responsible for a continuous and systematic collection of students´views. The evaluation report is presented for the students and will be the basis for the future design of the course.

## Miscellaneous

Required reading and teaching tools

To be specified.