

## Computations with MATLAB

Programme course

4 credits

Matematiska beräkningar med MATLAB

TAIU07

Valid from: 2017 Spring semester

**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

G<sub>1</sub>N

#### Course offered for

• Mechanical Engineering, B 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

The course aims to give

- basic skills in using mathematical software for future courses where MATLAB is used
- an increased understanding of linear algebra and geometry

After finishing the course the student should be able to

- use built in MATLAB commands for mathematical computations and visualising computed results
- divide complex computational problems into subproblems, and formulate and implement computer algorithms for solving these problems



#### Course content

- 1. The basics
  - MATLABs interface, variables, matrices, assignment, indexing with scalars and vectors, colon notation, static and dynamic memory allocation, basic arithmetics, elementwise operations and matrix operations, comformality, transpose, solving linear systems of equations
- 2. Visualisation and data processing Visualising curves, surfaces and time dependent objects, printing and exporting graphics, commands for generating vectors and matrices, mathematical constants and functions, curve fitting, complex numbers, random numbers
- 3. Algorithms and programming
  Dividing computational problems into subproblems, formulating
  algorithms, iteration and selection, programming in MATLAB, relational
  operators, boolean algebra, input and output, commenting programming
  code

## Teaching and working methods

Lectures, exercises, assignments, tutorials and seminars.

#### **Examination**

UPG1	Hand-in assignments	2 credits	U, G
DAT1	Written examination	2 credits	U, 3, 4, 5

#### Grades

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

## Department

Matematiska institutionen

## Director of Studies or equivalent

Ingegerd Skoglund

#### **Examiner**

Fredrik Berntsson

#### Course website and other links

http://courses.mai.liu.se/GU/TAIU07



# Education components Preliminary scheduled hours: 42 h

Recommended self-study hours: 65 h

### Course literature

P Jönsson, MATLAB beräkningar inom teknik och naturvetenskap, tredje upplagan, Studentlitteratur, 2010.



#### **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.

