

# Foundation Course in Mathematics

Programme course

6 credits

Matematisk grundkurs

TNA001

Valid from: 2018 Spring semester

**Determined by**

Board of Studies for Electrical  
Engineering, Physics and Mathematics

**Date determined**

## Main field of study

Mathematics, Applied Mathematics

## Course level

First cycle

## Advancement level

G1X

## Course offered for

- Master of Science in Electronics Design Engineering
- Master of Science in Communications, Transport and Infrastructure
- Master of Science in Media Technology and Engineering

## Intended learning outcomes

The course shall give the student a positive start of the university studies, both in getting good relations with other students and in refreshing former mathematics. Further more some new mathematical concepts will be introduced. An important aim is to systematically give opportunities to improve some important skills by using various teaching procedures and several examination forms. This is aimed to improve the ability in reflecting about how the student herself /himself learns and in developing how to work with other students in a group, which shall be seen as a resource where good cooperation will be encouraged. After a completed course, the student should be able to:

- read and interpret mathematical text
- use calculation rules for real and complex numbers
- use basic properties for real functions such as domain and range, composite functions, inverses
- quote and use properties of elementary functions
- solve equations and inequalities
- quote and use properties for arithmetic and geometric sequences and sums and the binomial theorem
- explain and use the principle for mathematical induction
- use basic definitions and ideas in vector geometry and use equations for lines and planes, solve linear systems of equations
- quote some central definitions, theorems and carry out some proofs.

## Course content

Algebraic expressions, inequalities, modulus, complex numbers. Solving equations. Functions and graphs. Definitions and properties of the elementary functions: natural logarithm, exponential function, power function, trigonometric functions, inverse trigonometric functions and complex exponential function. The Euler formulas. Basic principles of logic. Different types of proof techniques. Vectors and coordinate systems in the plane. Polar coordinates. Lines and circles. The complex plane. Complex numbers in polar form.

## Teaching and working methods

Problem classes, tutorials, and a few lectures.

## Examination

|      |                                    |             |            |
|------|------------------------------------|-------------|------------|
| KTR1 | Optional examinations              | 0 credits   | D          |
| UPG1 | Assignments and oral presentations | 1.5 credits | U, G       |
| TEN1 | Written examination                | 4.5 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

Claes Algström

## Course website and other links

<http://lisam.liu.se>

## Education components

Preliminary scheduled hours: 89 h

Recommended self-study hours: 71 h

## Course literature

### Books

Forsling-Neymark, *Matematisk analys, en variabel 2*  
Chapter 1-2

### Compendia

Material published by the Department of Mathematics.