



# SF1679 Discrete Mathematics

## 7.5 credits

Diskret matematik

This is a translation of the Swedish, legally binding, course syllabus.

### Establishment

Course syllabus for SF1679 valid from Autumn 2019

### Grading scale

A, B, C, D, E, FX, F

### Education cycle

First cycle

### Main field of study

Technology

### Specific prerequisites

Completed basic course SF1672 Linear Algebra or SF1624 Algebra and Geometry.

### Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

# Intended learning outcomes

After the course the student should be able to

- use concepts, theorems and methods to solve and present solutions to problems within the parts of discrete mathematics described by the course content,
- read and comprehend mathematical text

in order to

- gain basic knowledge of discrete mathematics and elementary graph theory,
- acquire better problem solving abilities in elementary combinatorics,
- gain knowledge of how to use some abstract algebraic structures,
- practice in conducting stringent mathematical reasoning and construction of mathematical proofs.

## Course contents

The fundamental theorem of arithmetic, the Euclidian algorithm and a Diophantine equation. Modular arithmetic, the Chinese remainder theorem, Fermat's little theorem and RSA. Equivalence relations, partial orders, induction and recursion. Functions, infinite sets and cardinality. Elementary group theory, the theorem of Lagrange, the symmetrical group and the lemma of Burnside. Error correcting codes, Hamming codes. Generating functions and partitions of integers. Combinatorics, multinomial numbers, Stirling numbers, the sieve principle and the Möbius inversion formula. Elementary graph theory, planar graphs, coloring problems, matchings in bipartite graphs.

## Course literature

Announced no later than 4 weeks before the start of the course on the course web page.

## Examination

- TEN1 - Exam, 7.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

The examiner decides, in consultation with KTHs Coordinator of students with disabilities (Funka), about any customized examination for students with documented, lasting disability. The examiner may allow another form of examination for re-examination of individual students.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.