



SF1688 Discrete Mathematics

6.0 credits

Diskret matematik

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

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

Establishment

Course syllabus for SF1688 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 courses SF1671 Mathematics, Basic course, with Discrete Mathematics and 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

- formulate basic theorems and definitions of important concepts with discrete mathematics,
 - apply theorems and methods in discrete mathematics,
- 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.

Course contents

Linear recursion with constant coefficients. The Master theorem.

Graphs. Euler circuits, Hamilton cycles. Trees. Graph coloring. Planar graphs. Euler's polyhedron formula, Kuratowski's theorem. Bipartite graphs. Hall's marriage theorem. Augmenting alternating paths. Transversals.

Integer arithmetic. Modular arithmetic. Euler's ϕ - and Möbius'-function. Euler's theorem and Fermat's little theorem.

Permutations. Cycle notation. Conjugated permutations. Even and odd permutations.

Basic group theory. Order of group elements and group. Cyclic groups. The symmetric group. Subgroups, cosets. Lagrange's theorem. Group actions on sets. Burnside's lemma.

Rings and fields. Factorization of polynomials. Irreducible polynomials. Finite fields.

Error correcting linear binary codes. RSA cryptosystem. Primality tests.

Course literature

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

Examination

- TEN1 - Exam, 6.0 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.

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.