SF1679 Discrete Mathematics 7.5 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 SF1679 valid from Autumn 2016

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

SF1604 Linear algebra or a corresponding course.

Language of instruction

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

Intended learning outcomes

The overall goal is to give basic knowledge in discrete mathematics, in particular a good knowledge in elementary combinatorics, knowledge of some abstract algebraic structure and the use of it, and knowledge of some selected topics in graph theory. In the course the ability to conduct stringent mathematical reasoning is practised.

After the course it is expected that the student will have acquired a better ability for treating and applying mathematics in general.

Course contents

The fundamental theorem of arithmetic, the Euclidian algorithm and a Diophantine equation. Modular arithmetic, the Chinese remainder theorem, Fermat's theorem and RSA. Equivalence relations, partial orders, induction and recursion. Functions, infinite sets and cardinality. Elementary group theory, the theorem of Langrange, 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. Introduction to model theory: the compactness theorem, Gödel's incompleteness theorem, ordinals and cardinals, the axiom of choice.

Course literature

Biggs, Discrete Mathematics, 2nd edition.

Extra material distributed during the course.

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.

Other requirements for final grade

Written exam, possibly with continuous examination (TEN; 7.5 hp).

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.