Discrete Mathematics

Programme course

8 credits

Diskret matematik

TATA32

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G1X

Course offered for
- Mathematics, Bachelor's Programme
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M 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.

Prerequisites
Admisson to the course requires , as well as general university requirements, secondary school mathematics (or equivalent).

Intended learning outcomes
To give the basic knowledge of discrete mathematics that is needed for further courses in mathematics, natural science and computer science. After this course the student should be able to:

- understand and use the terminology and laws of set theory
- formulate and solve combinatorial problems on permutations and combinations
- use the principle of mathematical induction to prove theorems and formulas
- perform calculations in modular arithmetic with applications in RSA-cryptography
- use the Euclidean algorithm to solve Diophantine equations
- identify equivalence relations and partial orders
- determine the disjunctive and conjunctive normal forms for Boolean functions
- master the foundation of graph theory and use graphs as a tool to model real-life problems

Course content
Set operations, the laws of set theory and Venn diagrams. Mathematical induction and recursion. Combinatorics with permutations and combinations. Number theory with some applications in cryptography. Relations and functions, especially partial orders, equivalence relations and Boolean functions. Graphs: planarity, coloring, chromatic polynom, Euler tours and some applications.

Teaching and working methods
Teaching is done through lectures and problem classes.
The course runs over the entire autumn semester.

Examination

TEN1	Written examination	8 credits	U, 3, 4, 5

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

Department
Matematiska institutionen

Director of Studies or equivalent
Jesper Thorén

Examiner
Armen Asratian

Course website and other links
http://www.mai.liu.se/und/kurser/index-amne-tm.html

Education components
Preliminary scheduled hours: 76 h
Recommended self-study hours: 137 h

Course literature

Additional literature

Books

Asratian, Björn och Turesson, *Diskret matematik*

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.