Discrete Mathematics

Programme course

6 credits

Diskret matematik

TATA65

Valid from: 2017 Spring semester

Determined by
Board of Studies for Computer Science
and Media Technology

Date determined
2017-01-25

Main field of study
Mathematics, Applied Mathematics

Course level
First cycle

Advancement level
G1X

Course offered for
- Computer Science and Engineering, M Sc in Engineering
- Computer Science and Software Engineering, 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.

Intended learning outcomes
The course provides the conceptual framework and the techniques in discrete mathematics used in software development, theoretical computer science, database theory and also in further studies in discrete mathematics. After the course students will be able to read and understand literature and articles of a theoretical nature in the computer sciences, and structure and present the content in these, which means that the student:

- can assimilate and apply the language and operations of set theory and be familiar with the definitions and properties of relations and functions
- will be able to prove statements by use of mathematical induction, as well as understand links between induction and recursion
- can organize, formulate and solve combinatorial problems on permutations and combinations
- has mastered the basics of integer arithmetics and congruence calculation and applications in cryptography
- has a good knowledge of rules and structures of Boolean algebras and partial orders
- knows graph theory terminology and applications such as tree and graph coloring and can use graph theory as a tool for modeling

Course content
Set theory with operations, Venn diagrams and counting. Relations. The Binomial theorem. Permutations and Combinations. The Principle of inclusion and exclusion. Induction and recursion. Graphs, trees, binary trees. The coloring of graphs. Chromatic numbers and polynomials. Number theory. Congruences. The Euclidean algorithm and Diophantine equations. Partial orders and equivalence relations with partitions. Lattice and Boolean functions.

Teaching and working methods
Lectures and lessons.

Examination

UPG1	Assignments	2 credits	U, G
TEN1	Written examination	4 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
Carl Johan Casselgren

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

Education components
Preliminary scheduled hours: 80 h
Recommended self-study hours: 80 h

Course literature
Fastställs senare

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.