



Course syllabus

Faculty of Technology
Department of Mathematics

1MA405 Diskret matematik och matematiskt tänkande, 7,5
högskolepoäng

Discrete Mathematics and Mathematical Thinking, 7.5 credits

Main field of study

Mathematics

Subject Group

Mathematics

Level of classification

First Level

Progression

GIN

Date of Ratification

Approved by Faculty of Technology 2018-10-15

The course syllabus is valid from autumn semester 2019

Prerequisites

General entry requirements and Chemistry 1, Mathematics 4, Physics 2 or Chemistry A, Mathematics E, Physics B (Field-specific entry requirements 9/A9).

Objectives

After completing the course, the student should be able to:

- solve problems, perform calculations, and conduct lines of reasoning within the part of mathematics that is covered by the course, and to communicate these solutions, calculations, and reasonings in writing,
- describe definitions, and formulate and prove theorems that are central to the course.

Content

The main goal with the course is to give an introduction to discrete mathematics and preparation for further studies in mathematics, programming and use of mathematical software.

The course cover content from the following topics within the area of discrete mathematics:

- logic: propositional logic and quantifiers, introduction to proofs,
- set theory: sets, set operations,
- functions: injectivity, surjectivity, inverse functions, composition of functions, graphs of functions, number sequences and summations,

- number theory: divisibility, modular arithmetic, primes, the fundamental theorem of arithmetics, the Euclidean algorithm,
- mathematical induction,
- combinatorics: basic counting principles, permutations and combinations, the binomial theorem, applications to probability theory,
- relations: properties, representations, equivalence relations, partial orderings,
- a little bit about trees and graphs.

The course also covers topics in mathematical writing and mathematical thinking.

Type of Instruction

Lectures and seminars.

Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

The student's knowledge in problem solving and theory is assessed in the form of written examination. Mathematical writing and mathematical thinking is assessed in the form of assignments. The final grade is determined by a weighted average of the result of the two examinations.

Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

Credit Overlap

The course cannot be included in a degree along with the following courses of which the content fully, or partly, corresponds to the content of this course: IMA462 Discrete Mathematics and Mathematical Thinking, 7,5 credits

Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

Required Reading and Additional Study Material

Required reading

Kenneth Rosen, Discrete Mathematics and its Applications, latest edition, 295/830 pages.

Kevin Houston, How to think like a Mathematician, Cambridge Uni. Press, latest edition, 100/280 pages.

Franco Vivaldi, Mathematical Writing, Springer, latest edition, 50/200 pages.