



# LT1001 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

On 15/10/2021, the Dean of the ITM school has decided establish this official course syllabus to apply from spring term 2023, registration number: M-2021-1850. .

### Grading scale

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

### Education cycle

First cycle

### Main field of study

Technology

### Specific prerequisites

General entry requirements.

### Language of instruction

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

## Intended learning outcomes

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

1. perform operations on functions Use Euclid's algorithm to calculate the greatest common divisor to two integers  $a$  and  $b$  and I see solve the Diophantine equation  $ax + by = c$
2. Use Euclid's algorithm to calculate the greatest common divisor to two polynomials
3. Use knowledge in discrete mathematics to solve combinatorial problems and permutations
4. Use Lagrange's theorem for groups
5. Explain the concepts of sub-groups, coset and the order of elements
6. Explain basic concepts in graph theory such as: isomorphism, degree (valency), coherence, path, cycle, Hamiltonian cycle and Eulerian circuit

## Course contents

This course is designed to help the students to develop basic technical proficiency in discrete mathematics that is used in natural sciences and engineering and to solve everyday problems. The course aims also to help students to develop and apply logic for quantified statements, precision and language to achieve mathematical certainty in problem-solving. Content that is brought up:

- The concept of discrete mathematics
- Arithmetic algorithms
- Modulo calculations
- Polynomials
- Set theory
- Functions and relations
- Number sequences (arithmetic or geometric)
- Basic combinatorial methods
- Algebraic structures
- Basic graph theory

## Examination

- KON1 - Partial exam, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- PRO1 - Project, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - Written exam, 3.5 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.

## **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.