



Course syllabus

Faculty of Technology

Department of Mathematics and physics

1MA401 Grundläggande matematik, 7,5 högskolepoäng

Basic Mathematics, 7.5 credits

Main field of study

Mathematics

Subject

Mathematics

Level

First cycle

Progression

G1N

Date of Ratification

Approved 2014-10-03.

Revised 2022-10-24.

The course syllabus is valid from autumn semester 2023.

Prerequisites

General entry requirements + Mathematics 4/Mathematics D.

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

- Real numbers and arithmetic rules.
- Logic: Implication, equivalence, conjunction, disjunction, negation, truth tables.
- Set theory: Sets, subsets, intersection, union, complement. Venn diagrams, formal definitions and proofs, de Morgan's laws.
- Polynomials, rational expressions, radical expressions, algebraic rules.
- Trigonometric expressions and formulas.
- Equations and inequalities, functions, domain and range, elementary functions, inverse functions.
- Introduction to number theory: Divisors, prime numbers, the division algorithm. Euclid's algorithm, Diophantine equations.
- Introduction to proof by induction.
- Introduction to combinatorics: Permutations, combinations, the binomial theorem.
- Complex numbers: Real part, imaginary part, modulus, conjugate. Arithmetic rules, the complex plane, polar form, de Moivre's formula, binomial equations, quadratic equations with complex solutions.
- The division algorithm for polynomials, the factor theorem, the theorem on conjugate roots for real polynomials.

Type of Instruction

Lectures and seminars.

Examination

The course is assessed with the grades A, B, C, D, E 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 is assessed in the form of a written exam.

Repeat examination is offered in accordance with Local regulations for courses and examination at the first and second-cycle level at Linnaeus University.

If the university has decided that a student is entitled to special pedagogical support due to a disability, the examiner has the right to give a customised exam or to have the student conduct the exam in an alternative way.

Course Evaluation

During the implementation of the course or in close conjunction with the course, a course evaluation is to be carried out. Results and analysis of the course evaluation are to be promptly presented as feedback to the students who have completed the course. Students who participate during the next course instance receive feedback at the start of the course. The course evaluation is to be carried out anonymously.

Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course:
1MA101, 7.5 credits, 1MAÄ12, 7.5 credits, Module 1 in 1MAÄ02 and 1FMÄ02, 1MA441 5 credits, 1MA405, 4 credits and 1MA912, 3 credits.

Other Information

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

Carl Stitz, Jeff Zeager (2013). *Precalculus*. Available: <http://www.stitz-zeager.com/szprecalculus07042013.pdf>. 600 (1079)

Material from the department