

SYLLABUS

Algebra and Euclidian Geometry 7.5 credits M0062M

Algebra och euklidisk geometri

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2022-02-14**

Algebra and Euclidian Geometry 7.5 credits M0062M

Algebra och euklidisk geometri

First cycle, M0062M

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Matematik	Mathematics

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and the course Linear Algebra and Integral Calculus (M0058M) or equivalent.

Selection

The selection is based on 1-165 credits.

Course Aim

The course will provide basic knowledge of concepts and methods in abstract algebra and Euclidean geometry. In algebra, it focuses on providing skills about mathematics' most common algebraic structures and their properties. The course will also provide an introduction to the classical Euclidean geometric constructions and provide insight into proofing in school mathematics. The course will hence contribute to the development of axiomatic and creative thinking skills as well as the ability to see connections between different areas in mathematics.

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

- explain definitions and basic properties of groups, rings and fields
- carry out formal proofs in abstract algebra
- motivate and analyze algebraic relations between the most common number systems and the different areas of school mathematics
- explain key concepts and definitions in algebra and Euclidean geometry
- formulate congruence cases and uniformity theorems and apply them to geometric problems
- perform geometric constructions with compass and ruler
- reflect on the basic concepts of algebra and Euclidean geometry from a historical and didactic perspective
- show understanding of the logical and axiomatic nature of mathematics and present mathematical reasoning to others.

Contents

Groups, rings, integral domains, fields, and isomorphism. Applications of the fundamental algebraic theory in school mathematics. Euclidean geometry. Geometric constructions with compass and ruler. Congruence, uniformity. Pythagoras' theorem. A short introduction to the history of non-Euclidean geometry.

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Lectures, laboratory work, and practicals.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. Written exam at the end of the course. The result of the written exam is stated as the final grade.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Transition terms

The course replaces M0014M

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written exam	G U 3 4 5	7.5	Mandatory	A22	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Syllabus established

by Niklas Lehto, Programme Director 2022-02-14