



**LUND**  
UNIVERSITY

Faculty of Science

## **MATB22, Mathematics: Linear Algebra 2, 7.5 credits**

*Matematik: Lineär algebra 2, 7,5 högskolepoäng*

**First Cycle / Grundnivå**

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### **Details of approval**

The syllabus was approved by Study programmes board, Faculty of Science on 2016-01-12 to be valid from 2016-01-13, spring semester 2016.

### **General Information**

The course is a compulsory course for first-cycle studies for a Bachelor of Science degree in mathematics and in physics.

*Language of instruction:* Swedish and English

*Main field of studies*

Mathematics

*Depth of study relative to the degree requirements*

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

### **Learning outcomes**

The aim of the course is to enable students to acquire the following knowledge and skills on completion of the course.

### **Knowledge and understanding**

On completion of the course, the student should be able to:

- give an account of and apply the theory of linear algebra,
- identify the logical structure in mathematical arguments and carry out mathematical proofs.

### **Competence and skills**

On completion of the course, the student should be able to:

- interpret relevant information, independently identify, state and solve problems that concern linear algebra,
- integrate concepts from the different parts of the course in connection with problem solving,
- give an account of mathematical arguments within the course frame in a logical and structured way,
- present and discuss mathematical arguments in speech and writing.

### **Judgement and approach**

On completion of the course, the student should be able to:

- use formal treatment of mathematics.

### **Course content**

Linear spaces and transformations, matrix representation of linear transformations. Euclidean spaces. Determinants. Eigenvalues and eigenvectors. The spectral theorem. Quadratic surfaces and quadratic forms.

### **Course design**

The teaching consists of lectures, seminars and, depending on the specialisation of the project, computer exercises. An essential element of the seminars is training in problem solving and oral mathematical communication.

A project that can consist of a number of assignments is included in the course requirements. The project consists of one of the following alternatives: to apply mathematical theory in computer programs to be able to solve problems relevant to the course content, a specialisation of theoretical aspects of the course or a didactic specialisation. The project also aims at providing the students with training in mathematical communication in speech and writing.

### **Assessment**

The examination consists of the following parts:

- presentation of the project (1.5 credits)
- written examination (6 credits)

Students who fail the ordinary written examination are offered a resit examination shortly thereafter.

*Subcourses that are part of this course can be found in an appendix at the end of this document.*

## Grades

Marking scale: Fail, Pass, Pass with distinction.

To achieve a Pass grade, a student is required to pass the project and the written examination. Whether the grade Pass with distinction should be given is decided by combining the results of the included examination parts.

## Entry requirements

To be eligible for the course, 30 credits in courses in mathematics equivalent to MATA21 Analysis in One Variable 15 credits, MATA22 Linear Algebra 1 7.5 credits, and one of the courses NUMA01 Computational Programming with Python 7.5 credits and MATA23 Foundations of Algebra, 7.5 credits, are required.

## Further information

The course may not be included in a degree together with MATB11 Linear Algebra, 7.5 credits.

## Subcourses in MATB22, Mathematics: Linear Algebra 2

Applies from V16

- 1601 Written exam, 6,0 hp  
Grading scale: Fail, Pass, Pass with distinction
- 1602 Project, 1,5 hp  
Grading scale: Fail, Pass