

Linear Algebra (I700202)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size (nominal values; actual values may depend on programme)
Credits 5.0 Study time 150 h Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 2)	Dutch	Gent	teaching methods	hours
			lecture	25.0 h
			seminar: practical PC room classes	6.0 h
			seminar: coached exercises	18.0 h

Lecturers in academic year 2020-2021

Waegeman, Willem LA26 lecturer-in-charge

Offered in the following programmes in 2020-2021

Programme	crdts	offering
Bachelor of Science in Bioscience Engineering Technology	5	A
Linking Course Master of Science in Bioscience Engineering Technology: Agriculture and Horticulture (main subject Horticulture)	5	A
Linking Course Master of Science in Bioscience Engineering Technology: Agriculture and Horticulture (main subject Plant and Animal Production)	5	A
Linking Course Master of Science in Bioscience Engineering Technology: Agriculture and Horticulture (main subject Tropical and Subtropical Agriculture)	5	A
Linking Course Master of Science in Biochemical Engineering Technology	5	A
Linking Course Master of Science in Bioscience Engineering Technology: Food Industry	5	A

Teaching languages

Dutch

Keywords

linear algebra and its applications

Position of the course

To teach students the most essential mathematical techniques, methods and skills, starting from a clearly defined level of foreknowledge. In this way students should be able to explore problems in their study field with a certain degree of exactness and to understand, to analyse and describe the different biological systems and production processes. A solid mathematical background needed in almost all engineering disciplines is surely based on a number of algebraic and analytic techniques (see table of contents). It is important that the students learn how to reason in a critical, logical, deductive and analytical way, without losing their sense for generality and abstraction. The subject matter of this course stimulates students to synthesize, plan and to work independently, essential qualities in the context of long-life learning. Various examples and exercises illustrate the theory. The proofs are restricted to a necessary minimum.

Contents

- Systems of linear equations
- Vector and matrix equations
- Linear transformations
- Matrix calculus
- Subspaces
- Determinants
- Eigenvalues and eigenvectors

Diagonalization of matrices
Complex numbers
Complex eigenvalues
Orthogonality
Symmetric matrices and quadratic forms
Extrema of functions of several variables
Extrema in a restricted domain
Numerical methods for finding extrema
Applications: flow in networks, balancing chemical equations, image processing, linear programming, linear regression, etc.

Initial competences

Contents of 'Basiskennis Wiskunde', differentiation techniques, analytical geometry, vector calculus.

Final competences

- 1 Being able to apply the concepts in pen-and-paper exercises, for which no calculator can be used.
- 2 Having understanding of the mathematical, geometric and physical interpretation of the concepts.
- 3 Being able to construct correct reasonings and write them down in a structured manner.
- 4 Being able to analyze the correctness of logical reasonings.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, seminar: coached exercises, seminar: practical PC room classes

Extra information on the teaching methods

During the lectures the concepts are introduced and made clearer by examples and applications.

During the coached exercises the students are further trained using standard and similar exercises.

Learning materials and price

A syllabus in English and lecture notes in Dutch.

References

David Lay. Linear Algebra and its applications, 5th edition.

Course content-related study coaching

The lecturer can be asked questions immediately after the course or by appointment.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination

Examination methods in case of periodic evaluation during the second examination period

Written examination

Examination methods in case of permanent evaluation

Written examination

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

First and second exam session: written, closed-book examination.

In between term evaluation: two written closed-book evaluations during the semester.

Calculation of the examination mark

NPE: 20%

PE: 80%

NPE does not count when worse than PE. In this way students can participate with less stress at NPE. Furthermore, students are not obliged to participate in NPE.