GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2024-2025

Linear Algebra (I002909)

Course size *(nominal values; actual values may depend on programme)*

Credits 4.0 **Study time 120 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	Dutch	Gent	seminar	20.0h
			lecture	20.0h

Lecturers in academic year 2024-2025

Schelfaut, An	LA26	staff member
Van de Walle, Elien	LA26	staff member
Waegeman, Willem	LA26	lecturer-in-charge

Offered in the following programmes in 2024-2025	**crdts**	**offering**
Bachelor of Science in Bioscience Engineering	4	A

Teaching languages

Dutch

Keywords

Linear algebra: theory and 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 (bio-engineer) 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 locus 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

Introductory calculus topics
Logic and proving methods
Systems of linear equations
Vector and matrix equations
Matrix calculus
Linear transformations
Vector spaces
Coordinate systems
Determinants
Eigenvalues and eigenvectors
Diagonalization of matrices
Complex numbers
Complex eigenvalues
Orthogonality
Symmetric matrices and quadratic forms
Applications: flow in networks, balancing chemical equations, image processing, discrete dynamical

systems, etc.

Initial competences

Final competences of secondary school or equivalent. Advise: required subjects in the curricula 'Mathematics' of the officially recognized educational networks in Flanders for programmes with at least 6 hours of mathematics training per week in the last two years of the secondary school program (general secondary education) are recommended.

Final competences

1 Obtain skills with respect to hand calculations
2 Understand the mathematical, geometrical and physical interpretation of concepts and their applications.
3 Being capable of deriving formal reasonings and writing them down in a structured way (proving skills).
4 Being capable of evaluating logical reasonings with respect to correctness.

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

Seminar, Lecture

Study material

Type: Syllabus

Name: Syllabus Lineaire algebra
Indicative price: Free or paid by faculty
Optional: no
Language : Dutch
Number of Pages : 300
Oldest Usable Edition : 2024
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : Yes

References

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

Course content-related study coaching

There are assistants to answer questions of students and to help them with their problems.
The course is issued in the e-learning environment Ufora.

Assessment moments

end-of-term assessment

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

Written assessment

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

Written assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Calculation of the examination mark

The exam consists of exercises, questions of a more theoretical nature and proving techniques.