

Course Specifications

Valid in the academic year 2018-2019

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 2018-2019

A (semester 2)	Dutch	seminar: coached exercises	25.0 h
		seminar: practical PC room classes	10.0 h
		lecture	25.0 h

Lecturers in academic year 2018-2019

Constales, Denis TW16 lecturer-in-charge

Offered in the following programmes in 2018-2019

	crdts	offering
Bachelor of Science in Engineering: Architecture	5	A
Preparatory Course Master of Science in Engineering: Architecture (main subject Architectural Design and Construction Techniques)	5	A
Preparatory Course Master of Science in Engineering: Architecture (main subject Urban Design and Architecture)	5	A

Teaching languages

Dutch

Keywords

Geometry, linear algebra

Position of the course

This course aims to provide students with the basic concepts and methods of linear algebra through concrete examples and applications of geometry. Furthermore the student acquires insight in three-dimensional structures and also learns to apply geometric techniques. Attention is also paid to interesting curves and surfaces, partly with a view to modeling and design.

Contents

- Vector spaces, bases and dimensions
- Straight lines and planes, curves and surfaces
- Systems of linear equations, matrices, determinants
- Matrices and linear transformations; affine and euclidean coordinate transforms; axonometry
- Eigenvalues and eigenvectors of a matrix or of a linear transformation
- Reduction of quadrics and conic sections
- Surfaces of revolution
- Ruled surfaces

Initial competences

Knowledge of basic mathematical concepts: integers, fractions, real numbers, polynomials, trigonometry, functions of one real variable, derivatives.

Final competences

- 1 To understand geometry and linear algebra and apply them creatively and effectively within the field of architecture and engineering.
- 2 Creative and purposeful use of supporting science and technology (geometric and algebraic formalism and Maple software).
- 3 To apply current geometric and algebraic models, methods and techniques in assignments.
- 4 To formulate systematically and in a structured way geometric and algebraic

- questions and to evaluate solutions and answers.
- 5 Conceptual, analytical and system-oriented problem solving and design-oriented thinking on different levels of abstraction of geometry and algebra.
 - 6 To know and apply correctly geometric and algebraic concepts (vectors, curves, surfaces, matrix types, etc.) and their terminology.

Conditions for credit contract

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

Conditions for exam contract

Access to this course unit via an exam contract is unrestricted

Teaching methods

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

Extra information on the teaching methods

During the lectures the most important concepts and their basic properties are introduced and further trained during particular lectures for exercises, where classical, well-structured methods are taught for standard applications.

During the exercises in the PC rooms, further skills are trained in the application of the learned techniques to new problems.

During the exercises in the class room priority goes to theoretical exercises enhancing the insight in the theoretical concepts.

Learning materials and price

Lecture notes in Dutch, at a cost of approximately 10 euro. The slides for theory and exercises, and the problems and model solutions of the PC classes are distributed free of charge via Minerva.

References

- J.H. Kindle, Theory and problems of plane and solid analytic geometry, Schaum's outline series, Mac Graw-Hill, New York
- J. Golan, Foundations of Linear Algebra, Kluwer

Course content-related study coaching

The lecturer is available after classroom lectures. Interactive support through the Minerva forum. Additional tutoring services are available from the Monitoraat.

Evaluation methods

end-of-term evaluation

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

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

Written exam in the PC lab, with open syllabus, exercises only.

Calculation of the examination mark