014IN - GEOMETRIA

Dipartimento di Ingegneria ed Architettura

Università degli Studi di Trieste

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PLAN

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Aims

To give the basic knowledge of linear algebra and of affine geometry, of the main techniques to solve systems of linear equations, of matrix computations. Teach to solve exercises.

Prerequisites

Knowledge of mathematical topics from high school, such as numbers (natural, integers, rational and real), operations between them, elementary algebra, sets, elements of Euclidean geometry and trigonometry. Some of these topics will be reviewed at the beginning and during the course.

Contents

- Basics of set theory and function theory. Algebraic structures: rational, real and complex numbers; operations and their properties; polynomials; rings and fields.
- Solutions of systems of linear equations: Gauß' method.
- Vector spaces.
- Linear functions and matrices, change of basis, the determinant.
- Linear functions and systems of linear equations.
- Diagonalization of endomorphisms, eigenvalues and eigenvectors.
- Affine geometry.
- Euclidean and Hermitian vector spaces, Euclidean geometry.
- The spectral theorem.

Exams
Written and oral exams.

Textbooks

- Francesco Bottacin. Algebra lineare e geometria. Esculapio, Bologna, II Ed., 2016.
- Marco Abate, Chiara de Fabritiis. Geometria analitica, con elementi di algebra lineare. III edizione. McGraw-Hill.