

Course title: LINEAR ALGEBRA 2

ECTS credit allocation (and other scores): 5

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Natural sciences

Language: English

Number of hours per semester: 30 lectures + 30 classes = 60 hours

Course coordinator/ Department and e-mail: Erasmus coordinator Anna Szczepkowska/ WMil,  
erasmuswmil.uwm.edu.pl

Type of classes: classes and lectures

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Substantive content

CLASSES:

Computations of determinants and rank of a matrix. Change of bases. Calculations of eigenvalues and eigenvectors. Solving systems of linear equations. Kronecker - Capelli theorem. Bilinear and quadratic forms. Scalar products, orthogonalization. External product in three space, calculation of area and volume. Isometric linear maps. Self-adjoints maps.

LECTURES:

Determinant of a matrix, its properties. Calculations: developing method of Laplace, elementary operations, triangular matrices. Inverse matrix. Linear mappings, matrix of a linear map in given bases, matrix of base change. Similarity of matrices. Eigenvectors and eigenvalues. Characteristic equation. Systems of linear equations, space of solutions, Cramer formulas. Rank, theorem of Kronecker and Capelli. Gauss method. Linear functionals. Bilinear forms, scalar products. Quadratic forms. Gram - Schmidt orthogonalization method. Area and volume. Isometries, self-adjoint maps. Affine maps.

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LEARNING OBJECTIVE

To get skills in solving systems of linear equations, applying methods of linear algebra to some problems (as computation of eigenvectors, analysis of quadratic forms and linear mappings).

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On completion of the study programme the graduate will gain:

Knowledge:

Students has knowledge of using notions of linear algebra

Skills:

Calculations of determinants, inverse matrices, solutions of systems of linear equations, eigenvalues, eigenvectors, area and volume. modern aspects of science and are able to find the necessary information in various sources.

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Basic literature:



- 1) Sheldon Axler, Linear algebra done right, Springer International Publishing AG, 2014; 2) Ron Larson, Elementary linear algebra, Houghton Mifflin Harcourt; Sixth Edition, 2009, 3) Jim Hefferon, Linear Algebra, Createspace Independent Publishing Platform, 2012.
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The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 2,52 ECTS points,

Student's independent work: 2,48 ECTS points,