



Subject card

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| Subject name and code | , PG_00058868 | | | | | | |
| Field of study | Nanotechnology | | | | | | |
| Date of commencement of studies | October 2023 | | Academic year of realisation of subject | | 2023/2024 | | |
| Education level | first-cycle studies | | Subject group | | Obligatory subject group in the field of study | | |
| Mode of study | Full-time studies | | Mode of delivery | | at the university | | |
| Year of study | 1 | | Language of instruction | | Polish | | |
| Semester of study | 1 | | ECTS credits | | 6.0 | | |
| Learning profile | general academic profile | | Assessment form | | assessment | | |
| Conducting unit | Department of Differential Equations and Mathematical Applications -> Faculty of Applied Physics and Mathematics | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr Anna Niewulis | | | | |
| | Teachers | | mgr Katarzyna Kiepiela | | | | |
| | | | dr Leszek Ziemczonek | | | | |
| | | | dr Anna Niewulis | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 15.0 | 45.0 | 0.0 | 0.0 | 0.0 | 60 |
| | E-learning hours included: 0.0 | | | | | | |
| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | | Participation in consultation hours | | Self-study | SUM |
| | Number of study hours | 60 | | 10.0 | | 80.0 | 150 |
| Subject objectives | The aim of this subject is to obtain the students competence in the range of using the basic methods of linear algebra and analytic geometry. Furthermore, the student should be able to use this knowledge to solve simple theoretical and practical problems that can be found in the field of engineering. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | K6_W02 | | Student defines the basic concepts of linear algebra Student uses basic notions and formulas of matrix calculus in solving systems of linear equations Student analyses a given problem from analitic geometry | | [SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation | | |
| | K6_U01 | | The student recognizes the importance of proper handling basic mathematical apparatus in the context of studies in technical fields. | | [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information | | |

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| Subject contents | <p>Elements of linear algebra:</p> <p>Matrices (definition, types of matrices, matrix operations).</p> <p>Determinants and their properties.</p> <p>Inverse matrix of non-singular matrix.</p> <p>Matrix equations.</p> <p>Systems of linear equations.</p> <p>Cramer's theorem.</p> <p>Rank of the matrix.</p> <p>Kronecker-Capelli's theorem</p> <p>Basic definitions and properties of vectors.</p> <p>Eigenvalues and eigenvectors of an matrix.</p> <p>Elements of analytic geometry:</p> <p>Scalar and vector product and their applications.</p> <p>Triple product and its use.</p> <p>Equation of a line and a plane in the space.</p> <p>Distance of the point from the plane.</p> <p>The angle between planes and lines.</p> <p>Complex numbers:</p> <p>Operations on complex numbers.</p> <p>Algebraic, trigonometric and exponential form of a complex number.</p> <p>Exponentiation and roots of complex numbers.</p> | | |
| Prerequisites and co-requisites | | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | scores of two tests | 50.0% | 100.0% |
| Recommended reading | Basic literature | <p>T. Jurlewicz, Z. Skoczylas <i>Algebra liniowa 1</i>, Oficyna Wydawnicza GiS</p> <p>T. Jurlewicz, Z. Skoczylas <i>Algebra liniowa 2</i>, Oficyna Wydawnicza GiS</p> <p>K. Jankowska, T. Jankowski, <i>Zbiór zadań z matematyki</i>, Wyd. PG, Gdańsk</p> | |
| | Supplementary literature | <p>K. Jankowska, T. Jankowski, <i>Zadania z matematyki wyższej</i>, Wyd. PG, Gdańsk</p> | |
| | eResources addresses | <p>Adresy na platformie eNauczenie:</p> <p>WFTiMS - NT - Algebra liniowa z geometrią 2023/2024 (A.Niewulis) - Moodle ID: 32500 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32500</p> <p>WFTiMS - NT - Algebra liniowa z geometrią 2023/2024 (A.Niewulis) - Moodle ID: 32500 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32500</p> | |

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| Example issues/ example questions/ tasks being completed | <p>Solve the matrix equation.</p> <p>Determine the rank of a matrix</p> <p>Determine all eigenvalues and corresponding eigenvectors of the matrix</p> <p>Determine the roots of the nth degree of a complex number</p> |
| Work placement | Not applicable |