



Subject card

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|---|---|--|--|-------------------------------------|--|--|-----|
| Subject name and code | Linear algebra with geometry, PG_00034519 | | | | | | |
| Field of study | Technical Physics | | | | | | |
| Date of commencement of studies | October 2020 | Academic year of realisation of subject | | | 2020/2021 | | |
| Education level | first-cycle studies | Subject group | | | Obligatory subject group in the field of study Subject group related to scientific research 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 | 2 | ECTS credits | | | 5.0 | | |
| Learning profile | general academic profile | Assessment form | | | exam | | |
| Conducting unit | Department of Probability Theory and Biomathematics -> Faculty of Applied Physics and Mathematics | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr Joanna Cyman | | | | |
| | Teachers | | dr Joanna Cyman | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 30.0 | 0.0 | 0.0 | 0.0 | 60 |
| | E-learning hours included: 0.0 | | | | | | |
| | Adresy na platformie eNauczanie: Algebra liniowa 2021 - Moodle ID: 8879 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=8879 | | | | | | |
| 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 | | 5.0 | | 60.0 | 125 |
| Subject objectives | Getting to know the basic knowledge in the field of linear algebra and analytic geometry. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | | Method of verification | |
| | K6_U01 | | A student understands the value independent development of knowledge. He independently solves exercises that consolidate knowledge. | | | [SU2] Assessment of ability to analyse information | |
| | K6_W03 | | Student has basic knowledge in the field of linear algebra and analytical geometry; knows complex numbers, matrix calculus, vector algebra. He knows different methods of solving problems with complex numbers, matrices, solving systems of linear equations and methods of analytic geometry in space R^3 , in the scope necessary in the work of an engineer. | | | [SW1] Assessment of factual knowledge | |

| Subject contents | <p>Complex numbers. Operations on complex numbers. Solving algebraic equations in the complex space. Different forms of a complex number. Geometric interpretation, Gaussian plane. Exponentiation, nth root. The basic theorem of algebra.</p> <p>Matrix calculus. Matrix operations.. Determinants. Laplace expansion. Inverse matrix. Row of matrices, elementary transformations of matrix. Systems of linear equations. Cramer's rule. The existence of solutions of the system of linear equations, the Kronecker-Capelli theorem.</p> <p>Analytic geometry in space.Vectors. Scalar product, orthogonal vectors. Vector product, mixed product and its geometric interpretation. Equations of plane and line in R^3. Conical curves.</p> <p>Vector space. The base and dimension of space. Linear transformations. The kernel and image of transformation. Linear transformation matrix. Values and eigenvectors. Euclidean spaces. Gram–Schmidt process.</p> | | | | | | | | | | | | | | |
|--|---|-------------------------------|--|--------------------------|---|-------------------------------|--------------------------|---|------|----------------------|--|-------|--------------|-------|-------|
| Prerequisites and co-requisites | Basic knowledge of mathematics in the field of secondary school. | | | | | | | | | | | | | | |
| Assessment methods and criteria | <table border="1" data-bbox="448 584 1487 723"> <thead> <tr> <th data-bbox="448 584 794 618">Subject passing criteria</th> <th data-bbox="794 584 1141 618">Passing threshold</th> <th data-bbox="1141 584 1487 618">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 618 794 651">exercises</td> <td data-bbox="794 618 1141 651">50.0%</td> <td data-bbox="1141 618 1487 651">6.0%</td> </tr> <tr> <td data-bbox="448 651 794 685">colloquia</td> <td data-bbox="794 651 1141 685">50.0%</td> <td data-bbox="1141 651 1487 685">54.0%</td> </tr> <tr> <td data-bbox="448 685 794 723">egzamination</td> <td data-bbox="794 685 1141 723">50.0%</td> <td data-bbox="1141 685 1487 723">40.0%</td> </tr> </tbody> </table> | | | Subject passing criteria | Passing threshold | Percentage of the final grade | exercises | 50.0% | 6.0% | colloquia | 50.0% | 54.0% | egzamination | 50.0% | 40.0% |
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| Example issues/ example questions/ tasks being completed | 1.Mark on the complex plane the set described by inequality: $2 < (3+4i)z+i < 3$. 2.Solve a system of equations: $4x+y+3z-t=5$ $2x-y+3z+2t=2$ $3x+y+2z-t=1$ $5x+y+4z+2t=0$. | | | | | | | | | | | | | | |
| Work placement | Not applicable | | | | | | | | | | | | | | |