Subject card

| Subject name and code | Linear algebra, PG_00021020 |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Field of study | Mathematics |  |  |  |  |  |  |
| Date of commencement of studies | October 2021 |  | Academic year of realisation of subject |  |  | 2021/2022 |  |
| Education level | first-cycle studies |  | Subject group |  |  | Obligatory subject group in the field of study <br> Subject group related to scientific research in the field of study |  |
| Mode of study | Full-time studies |  | Mode of delivery |  |  | blended-learning |  |
| Year of study | 1 |  | Language of instruction |  |  | Polish |  |
| Semester of study | 1 |  | ECTS credits |  |  | 5.0 |  |
| Learning profile | general academic profile |  | Assessment form |  |  | assessment |  |
| Conducting unit | Department of Nonlinear Analysis and Statistics -> Faculty of Applied Physics and Mathematics |  |  |  |  |  |  |
| Name and surname of lecturer (lecturers) | Subject supervisor |  | dr hab. Zdzisław Dzedzej |  |  |  |  |
|  | Teachers |  | dr inż. Anita Zgorzelska dr hab. Zdzisław Dzedzej |  |  |  |  |
| 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: 30.0 |  |  |  |  |  |  |
|  | Adresy na platformie eNauczanie: <br> Algebra liniowa 1 1002/1 - Nowy - Nowy - Moodle ID: 17223 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17223 |  |  |  |  |  |  |
| 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 | Basic notions of linear algebra |  |  |  |  |  |  |
| Learning outcomes | Course outcome |  | Subject outcome |  |  | Method of verification |  |
|  | K6_U08 |  | complex numbers, determinants, matrices, |  |  | [SU4] Assessment of ability to use methods and tools |  |
|  | K6_W07 |  | linear properties in calculus and other parts of mathematics |  |  | [SW1] Assessment of factual knowledge |  |
|  | K6_U03 |  | proper use of algebraic objects |  |  | [SU3] Assessment of ability to use knowledge gained from the subject |  |
|  | K6_U01 |  | proving simple properties of matrices, linear independence of vectors, |  |  | [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools |  |
|  | K6_W04 |  | formulates theorems and definitions |  |  | [SW1] Assessment of factual knowledge |  |
| Subject contents | linear equation systems- Gauss elimination, Cramer's method: matrices and their algebra; determinants definitions , properties and applications; invertibility of matrices, matrix equations; rank of matrices; rational, real and complex numbers- geometric interpretation, powers, the field of complex numbers, Euler formulas; basic algebraic notions: groups, rings, fields, vector spaces. Linear dependence of vectors; Bases of and dimension of vector spaces. General theory of linear systems- Kronecker- Capelli theorem. |  |  |  |  |  |  |
| Prerequisites and co-requisites |  |  |  |  |  |  |  |
| Assessment methods and criteria | Subject passing criteria |  | Passing threshold |  |  | Percentage of the final grade |  |
|  | 2 written tests |  | 50.0\% |  |  | 80.0\% |  |
|  | homeworks and activity |  | 10.0\% |  |  | 20.0\% |  |


| Recommended reading | Basic literature | A. Romanowski, Linear Algebra, Wyd. PG 2003. <br> T. Jurlewicz , Z. Skoczylas, Linear Algebra, GiS 2005 |
| :---: | :---: | :---: |
|  | Supplementary literature | J. Rutkowski,Linear Algebra liniowa in problems, PWN 2008 <br> G. Banaszak, W. Gajda, Elements of linear algebraj, WNT 2002. |
|  | eResources addresses | Algebra liniowa 1 1002/1 - Nowy - Nowy - Moodle ID: 17223 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17223 |
| Example issues/ example questions/ tasks being completed | 1. Draw the set $2<\mid z+$ <br> 2. Solve the system |  |
|  | $\begin{aligned} & x-y+z=1 \\ & 2 x-y=-1 \\ & -x+3 y-z=1 \\ & -2 y-z=-4 \end{aligned}$ |  |
|  | 3.Define the dimension of a linear space. |  |
| Work placement | Not applicable |  |

