



Subject card

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|---|--|--|-------------------------------------|------------|--|---------|-----|
| Subject name and code | Propedeutics of Mathematics, PG_00038084 | | | | | | |
| Field of study | Hydrogen Technologies and Electromobility | | | | | | |
| Date of commencement of studies | October 2022 | Academic year of realisation of subject | | | 2022/2023 | | |
| 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 | | | 4.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Mathematics Center -> Vice-Rector for Education | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Magdalena Musielak | | | | | |
| | Teachers | dr Magdalena Musielak mgr Karolina Lademann | | | | | |
| 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 | | | | | | |
| 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 | 6.0 | | 34.0 | 100 | |
| Subject objectives | Students obtain competence in the range of using methods of mathematical analysis and linear algebra and knowledge to solve simple problems that can be found in the field of engineering. | | | | | | |

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| Learning outcomes | Course outcome | Subject outcome | Method of verification |
| | [K6_W01] has basic knowledge of mathematics – including linear algebra, mathematical analysis, numerical methods – necessary to describe physical and chemical phenomena, as well as the analysis of electrical circuits and automation and robotics systems | Student names basic properties of elementary functions. Student solves equations and inequalities with elementary functions. Student examines monotonicity and boundedness of sequences. Student evaluates the limits of functions. Student explains the concept of limit and continuity of functions. Student gives a graphic interpretation of discontinuity points. Student uses the basic operations on complex numbers. Student performs calculations on complex numbers. Student determines the real and complex roots of polynomial | [SK1] Assessment of factual knowledge |
| | [K6_K02] can work in a group taking on different roles in it | Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem. Student understands the need of lifelong learning. Student is able to inspire others and organize their learning process. | [SK1] Assessment of group work skills |
| | [K6_U02] can work individually and in a team, can communicate using various techniques in a professional environment, as well as document and analyze the results of their work, can estimate the time needed to perform the entrusted task | Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions. Student recognizes the importance of skillful use of basic mathematical apparatus in terms of study in the future. Student recognizes the importance of self-expanding knowledge. | [SU4] Assessment of ability to use methods and tools |
| Subject contents | Set of real numbers. The absolute value of real number and its properties. Functions of one variable, basic properties, composite and inverse functions. Overview of elementary functions: linear, quadratic, power, polynomials, rational, exponential, logarithmic, trigonometric, cyclometric, hyperbolic. Equations and inequalities of different types, systems of equations and inequalities. Infinite sequences - limit of a sequence, arithmetic of limits. Arithmetic and geometric sequence. Number e. Complex numbers - algebraic, trigonometric, exponential form, operations, exponentiation (Moivre formula), finding roots of complex numbers. Elements of analytic geometry - line on the plane, circle, ellipse, parabola, hyperbole. Line and plane in 3-space. Limits and continuity of functions. Properties of continuous functions. | | |
| Prerequisites and co-requisites | - active participation in tutorials - passing written tests and colloquiums | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Work during tutorials | 0.0% | 10.0% |
| | Midterms | 50.0% | 90.0% |
| Recommended reading | Basic literature | 1. Praca zbiorowa pod redakcją Wikieł B.: Matematyka. Podstawy z elementami matematyki wyższej. Wyd. PG, Gdańsk, 2009. 2. Jurewicz T. Skoczylas Z.: Algebra liniowa 1. GiS, Wrocław, 2004. 3. Kryszicki W., Włodarski L.: Analiza matematyczna w zadaniach, cz.I. PWN, Warszawa, 2006. | |
| | Supplementary literature | 1. Jankowska K., Jankowski T.: Zbiór zadań z matematyki. Wyd. PG, Gdańsk, 1998. 2. Jankowska K., Jankowski T.: Zadania z matematyki wyższej. Wyd. PG, Gdańsk, 1999. | |
| | eResources addresses | Adresy na platformie eNauczenie: WEiA (TWiE) - Matematyka 2022/23 (M.Musielak) - Moodle ID: 25714 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=25714 | |
| Example issues/ example questions/ tasks being completed | 1. Solve the equation . 2. Find the domain and the set of values of the function $f(x)=...$. 3. Sketch the graph of the function $f(x)=$. 4. Evaluate the limit of a given sequence (a_n) . 5. Check the continuity of the following function $f(x)=$. | | |
| Work placement | Not applicable | | |