



Subject card

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| Subject name and code | Mathematics I, PG_00060503 | | | | | | |
| Field of study | Design and Construction of Yachts | | | | | | |
| Date of commencement of studies | October 2024 | | Academic year of realisation of subject | | 2024/2025 | | |
| 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 | | 9.0 | | |
| Learning profile | general academic profile | | Assessment form | | exam | | |
| Conducting unit | Mathematics Center -> Vice-Rector for Education | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr Cezary Mrozicki | | | | |
| | Teachers | | dr Cezary Mrozicki | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 45.0 | 60.0 | 0.0 | 0.0 | 0.0 | 105 |
| | 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 | 105 | | 11.0 | | 109.0 | 225 |
| Subject objectives | Students obtain competence in the range of using methods of mathematical analysis and knowledge how to solve simple problems that can be found in the field of engineering. | | | | | | |
| Learning outcomes | Course outcome | | Subject outcome | | Method of verification | | |
| | [K6_W01] has knowledge of mathematics, including algebra, elements of logic, geometry, mathematical analysis, and probabilistic necessary to describe and analyse the operation of yachts and devices installed on them | | The student lists the basic properties of elementary functions. The student solves equations and inequalities containing elementary functions. The student interprets geometrically the study of graphs of functions using the concept of limit and continuity of functions. The student defines the basic concepts of differential calculus of one variable. The student analyses the properties of functions on the basis of an examination of its first and second derivative. The student applies the basic rules and techniques of integration to calculate indefinite integrals. The student lists geometrical applications of definite integrals. The student distinguishes between types of improper integrals. The student solves equations using complex numbers. | | [SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects | | |
| | [K6_U02] can work individually and in a team, communicate through various techniques in professional environment and also record, analyse, and present the results of work, can estimate the time needed to complete a given task | | The student combines knowledge of mathematics with knowledge from other fields. | | [SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task | | |

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| Subject contents | <p>Functions of one variable and their properties: The absolute value function definition, solving equations and inequalities with absolute value, graphs of functions with absolute value. Power, exponential, logarithmic, trigonometric and cyclometric functions properties and graphs, solving equations and inequalities.</p> <p>Limits and continuity: Infinite sequences. Fundamental definitions of limit of sequence, convergence and divergence, limit theorems. Applications to solving equation.</p> <p>Differential calculus of functions with one variable and applications of differential calculus of functions with one variable: Definition of first derivative and differential. Rolls and Lagranges theorems. Higher derivatives and differentials. Monotonicity and local extrema. Convexity, concavity and inflexion points of a function. De lHospitals Theorem. Taylors Theorem. Asymptotes. Applying differential calculus to study the properties of one variable functions.</p> <p>Integral calculus of functions with one variable indefinite integral: Basic methods and ways of integration - integration by parts and substitution. Integration of rational functions, trigonometric and irrational.</p> <p>Definite integrals in Riemanns sense: Newton-Leibnitz Theorem. Integration formulas, the substitution method of integration and integration by parts for definite integrals. Applications of integral calculus in computing areas of plane figures, lengths of arcs, volumes of solids of resolution.</p> <p>Improper integral: Definition. Types of integrals.</p> <p>Analytic geometry in 3-space: Basic vectors definitions and properties. Eigenvectors and Eigenvalues. Dot product, cross product, triple scalar product - their properties and applications. Equations for lines and planes in 3-space. The distance from a point to a plan. Angles between planes and lines.</p> <p>Complex numbers: Algebraic form, equality, conjugation, operations, modulus, trigonometric form, operations in polar form, roots, solving equations.</p> | | |
| Prerequisites and co-requisites | There are no preliminary or additional requirements. | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Midterm colloquium | 50.0% | 50.0% |
| | Written exam | 50.0% | 50.0% |
| Recommended reading | Basic literature | Pod redakcją B. Wiekła, Matematyka. Podstawy z elementami matematyki wyższej. Wydawnictwo PG, Gdańsk 2009 W. Kryszicki, L. Włodarski, Analiza matematyczna w zadaniach 1, Wydawnictwo Naukowe PWN, Warszawa 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Definicje. Twierdzenia. Wzory. Oficyna Wydawnicza GIS, Wrocław 2008 M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Przykłady i zadania. Oficyna Wydawnicza GIS, Wrocław 2008 T. Jurlewicz, Z. Skoczylas, Algebra liniowa 1. Definicje. Twierdzenia. Wzory. Oficyna Wydawnicza GIS, Wrocław 2006 T. Jurlewicz, Z. Skoczylas, Algebra liniowa 1. Przykłady i zadania. Oficyna Wydawnicza GIS, Wrocław 2006 K. Jankowska, T. Jankowski, Zbiór zadań z matematyki, Wydawnictwo PG, Gdańsk 2008 K. Jankowska, T. Jankowski, Zadania z matematyki wyższej, Wydawnictwo PG, Gdańsk 2008 K. Jankowska, T. Jankowski, Funkcje wielu zmiennych. Całki wielokrotne. Geometria analityczna, Wydawnictwo PG, Gdańsk 2008 | |
| | Supplementary literature | W. Leksiński, I. Nabiałek, W. Żakowski, Matematyka. Definicje, twierdzenia, przykłady, zadania. WNT, Warszawa 2006 | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | 1. Investigate the monotonicity of the sequence (a_n) . 2. Enter the properties of the function $f(x) = \dots$ 3. Calculate the derivative of the function $f(x) = \dots$ 4. Determine the indefinite integral of the function $f(x) = \dots$ | | |
| Work placement | Not applicable | | |