GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | Engineering mathematics, PG_00061897 | | |
| Field of study | Materials Engineering | | |
| 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 | 2 | ECTS credits | 7.0 |
| Learning profile | general academic profile | Assessment form | exam |
| Conducting unit | Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Leszek Wicikowski | |
| | Teachers | | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 45.0 | 0.0 | 0.0 | 0.0 | 75 |

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 | 75 | 10.0 | 90.0 | 175 |

**Subject objectives**

The aim of this subject is to obtain the students competence in the range of using the basic methods of mathematical analysis and linear algebra.Furthermore, the student is 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_K01] Understands the need to improve professional and personal competencies; is conscious of own limitations and knows when to turn to experts, properly establishes priorities helping to accomplish tasks defined by oneself or others. | The student understands the need to follow scientific literature in order to constantly update his knowledge and is able to share knowledge with others. Is able to critically evaluate information. Is able to use literature and expert knowledge | [SK5] Assessment of ability to solve problems that arise in practice |
| [K6_W01] Has knowledge of selected branches of mathematics, useful for formulating and solving problems and describing mechanical and physical phenomena, and chemical processes. | The student analyzes the properties of the two variables function based on the differential calculus of multiple variables. Student applies double and triple integrals in geometry problems. Student determines general and specific integrals of some types of first and second order differential equations. Student examines the convergence of numerical and power series | [SW1] Assessment of factual knowledge |

**Subject contents**

Functions of two variables: Limit and continuity of a function of several variables. Partial derivatives. Total differential. Taylors formula.Maxima and minima of a function of several variables. Double integrals over rectangles and normal domains. Two dimensional change of variables theorem. Applications of double integrals. Triple integrals over cuboids and normal domains. Three dimensional change of variables theorem. Applications of triple integrals.Number series : Number series. Convergent and divergent series. Convergence tests of the number series. Function series: Power and Fourier series Ordinary differential equations: First order differential equations. General and particular solution. The Cauchy initial value problem. Variables separable, linear, Bernoulli, exact differential equations. Second order linear differential equations with constant coefficients

**Prerequisites and co-requisites**

An introductory course in mathematical analysis in the field of functions of one variable

| | | | |
|---|---|---|---|
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Exam | 50.0% | 50.0% |
| | Midterm quoloqium | 50.0% | 50.0% |
| Recommended reading | Basic literature | McQuarrie D - Matematyka dla przyrodników i inżynierów, PWN 2006, W. Żakowski, W. Kołodziej, "Matematyka, część II", WNT, Warszawa, 1992 Marian Gewert, Zbigniew Skoczylas, Analiza matematyczna 1 Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2004 Marian Gewert, Zbigniew Skoczylas, Analiza matematyczna 2 Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2005 Marian Gewert, Zbigniew Skoczylas, Równania różniczkowe zwyczajne. Teoria, przykłady, zadania, Oficyna Wydawnicza GiS,Wrocław 2004G.M. Fichtenholz "Rachunek różniczkowy i całkowy" tom I, II, IIIL. Siewierski "Ćwiczenia z analizy matematycznej z zastosowaniami" tom I, II, PWN, Warszawa 1982, W. Krysicki, L. Włodarski "Analiza matematyczna w zadaniach" cz. I, II,PWN, Warszawa 1986,W. Stankiewicz "Zadania z matematyki dla wyższych uczelnitechnicznych" część I, II, PWN, Warszawa 1980, | |
| | Supplementary literature | Kazimiera Jankowska, Tadeusz Jankowski, Zbiór zadań z matematyki, Wydawnictwo Politechniki Gdańskiej, Gdańsk 1997 Kazimiera Jankowska, Tadeusz Jankowski, Zadania z matematyki wyższej, Wydawnictwo Politechniki Gdańskiej, Gdańsk 1999 | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | | | |
| Work placement | Not applicable | | |

Document generated electronically. Does not require a seal or signature.