GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics II, PG_00064115		
Field of study	Mechanical and Medical Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
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	8.0
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 Anna Niewulis	
	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	15.0	0.0	90

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	90	14.0	96.0	200

Subject objectives

The aim of this subject is to obtain the student's competence in the range of using the basic methods of mathematical analysis. 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_U04] is able to utilize empirical, analytical, simulation, and computer-based methods to formulate and solve engineering tasks in the field of medical and mechanical engineering	The student is able to apply the mathematical methods for analysis to solve problems in the field of mechanical and medical engineering.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_U01] is able to acquire knowledge and self-studying, he/she is able to find needed information in specialist books, databases and other sources, he/she is able to integrate information and draw conclusions, he/she is able to communicate by using different technics in work and outside	The student appreciates the importance of expanding knowledge and takes up the challenges associated with working on group problem solving. The student combines knowledge in the field of mathematics with knowledge from other fields.	[SU2] Assessment of ability to analyse information
[K6_W01] has knowledge in the field of natural sciences, including mathematics, contemporary physics, chemistry, and human anatomy with physiology	The student uses basic derivative properties. The student analyzes the properties of the function based on the study of its first and second derivative. The student applies basic formulas and integration techniques to calculate indefinite integrals. The student performs basic operations on complex numbers.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>Complex numbers.Basic definitions and properties of vectors. Scalar, vector, mixed product - applications. Equation of a straight line and a plane in space.
Functions of many variables. Limit, function continuity, partial derivatives of functions of many variables, extremes of functions of many variables.
Double integral over rectangle and normal area. Polar coordinates. Applications. Triple integral over a cuboid and normal area. Cylindrical and spherical coordinates. Applications.
First order ordinary linear equation. Second order linear differential equations with constant coefficients. Fundamental set of solution of the homogeneous linear differential equation. Non-homogeneous linear differential equations. Higher order linear differential equations with constant coefficients.Systems of differential equations. Laplace transform. Partial linear differential equations of first order. The Cauchy initial value problem. Partial differential equations of second order .</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>No recomendations</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Test</td><td>50.0%</td><td>40.0%</td></tr>
<tr><td>Project</td><td>50.0%</td><td>10.0%</td></tr>
<tr><td>Exam</td><td>50.0%</td><td>50.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. G.M. Fichtenholz, Rachunek różniczkowy i całkowy,Tom 1, Wydawnictwo Naukowe PWN, Warszawa 2002 ,
2. B.Wikieł, Matematyka, Podstawy z elementami matematyki wyższej, Wydawnictwo Politechniki Gdańskiej Gdańsk 2009,
3. K.Jankowska, J.Jankowski, Zbiór zadań z matematyki, Wydawnictwo Politechniki Gdańskiej Gdańsk 2003,
4. W. Krysicki, L. Włodarski Analiza matematyczna w zadaniach część I, PWN, Warszawa 1986.</td></tr>
<tr><td>Supplementary literature</td><td>1. Gewert M., Skoczylas Z., "Analiza matematyczna 2. Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS
2. Jurlewicz T., Skoczylas Z., "Algebra i geometria analityczna. Definicje, twierdzenia, wzory", Oficyna Wydawnicza GiS
3. Kajetanowicz P., Wierzejewski J., ,,Algebra z geometrią analityczną", Wydawnictwo Naukowe PWN
4. W.Żakowski, W.Kołodziej , Matematyka część 2 Analiza Matematyczna, Wydawnictwa Naukowo- Techniczne Warszawa 12003
5. W. Krysicki, L. Włodarski Analiza matematyczna w zadaniach PWN, Warszawa 1986
6. W. Stankiewicz Zadania z matematyki dla wyższych uczelni technicznych, PWN, Warszawa 1980
7. K. Jankowska, T.Jankowski, Funkcje wielu zmiennych, Całki wielokrotne, Geometria analityczna</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Calculate a double integrals.
2. Calculate a riple integrals.
3. Find a general solution of differential equations.
4. Find a particular solution satisfying the given initial conditions of the differential equations.
5. Solve a system of differential equations.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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