GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Engineering mathematics, PG_00058998		
Field of study	Materials Engineering, Materials Engineering, Materials Engineering		
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	2	ECTS credits	7.0
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	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. 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_W01	Student uses methods of mathematical description of phenomena in the physical / mechanical / chemical processes.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
K6_U05	Student is able to process the acquired information, analyze and interpret it, draw conclusions and reason opinions.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
K6_K01	Student recognizes the importance of self-expanding knowledge and takes the challenge of working with a group to solve a problem.	[SK2] Assessment of progress of work [SK1] Assessment of group work skills

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. **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. Fundamental set of solution of the homogeneous linear differential equation. Higher order linear differential equations with constant coefficients. **Number series :** Number series. Convergent and divergent series. Convergence tests of the number series.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	50.0%	50.0%
Midterm colloquium	50.0%	50.0%

Recommended reading

Basic literature

1. G.M. Fichtenholz "Rachunek różniczkowy i całkowy" tom I, II, III

2. M. Grabowski "Analiza matematyczna" Powtórzenie, ćwiczenia i zbiór zadań, WNT, Warszawa 1997

3. R.Leitner, W. Matuszewski, Z. Rojek "Zadania z matematyki wyższej"

4. K. Dobrowolska "Matematyka dla studiów technicznych dla pracujących" tom I,II, PWN , Warszawa 1981,

5. L. Siewierski "Ćwiczenia z analizy matematycznej z zastosowaniami" tom I, II, PWN, Warszawa 1982,

6. W. Krysicki, L. Włodarski "Analiza matematyczna w zadaniach" cz. I, II, PWN, Warszawa 1986,

7. W. Stankiewicz "Zadania z matematyki dla wyższych uczelni technicznych" część I, II, PWN, Warszawa 1980,

8. M. Lassak "Zadania z analizy matematycznej"

	Supplementary literature	1. K. Jankowska, T. Jankowski "Zbiór zadań z matematyki wyższej", Wyd. PG, Gdańsk 1999, 2. K. Jankowska, T.J ankowski "Funkcje wielu zmiennych Całki wielokrotne Geometria analityczna", Wyd. PG, Gdańsk 2005 3. B. Gdowski, E. Pluciński "Zadania z rachunku wektorowego i geometrii analitycznej", PWN, Warszawa 1982 4. I. Dziubiński, L. Siewierski Matematyka dla wyższych szkół technicznych , PWN, Warszawa 1984,
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Compute the sum of the given series with general term an. 2. Check whether the given series is convergent using the ratio test, the root test.. the comparison test or the integral test. 3. Compute partial differentials of the second order for the given function f(x,y) . 4. Find extreme values of the function f(x,y). 5. Compute the double integral of the given function f(x,y) over the region D. . 6. Find the total differential of the function f. 7. Find the equation of the plane tangent to the surface S at the point P. 8. Find the general solution of the differential equation.. 9. Find a particular solution of the differential equation ... satisfying the given initial conditions . 10. Find the general solution of the differential equation . by the method of variation of parameters .	
Work placement	Not applicable	