GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematics II, PG_00050265		
Field of study	Mechatronics, Mechatronics		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2020/2021
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	6.0
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 Stanisław Domachowski	
	Teachers	dr Stanisław Domachowski	

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

WIMiO - Mtr - MATEMATYKA II 2020/21 (S.Domachowski) - Moodle ID: 13409
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13409

WIMiO - Mtr. - Elementy algebra liniowa 2020/21 (S.Domachowski) - Moodle ID: 15266
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15266

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	84.0	150

Subject objectives

The aim of the subject is to obtain the student's competence in the use of the basic apparatus of mathematical analysis and linear algebra and the application of the acquired knowledge to solve simple theoretical and practical problems occurring in engineering fields.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U03	Student recognizes the importance of self-expanding knowledge	[SU4] Assessment of ability to use methods and tools
K6_U01	Student combines knowledge of mathematics with knowledge from other fields.	[SU2] Assessment of ability to analyse information
K6_W01	Student analyses analitycal geometry problems. Student examines functions of several variables, using the concept of a limit, continuity and derivatives . Student calculates double and triple integrals and explains the method of substitution in these integrals. Student uses double and triple integrals in geometrical problems. Student computes the gradient of a scalar field, divergence and rotation of a vector field and a potential field. Student calculates a line integral on a plane and in a space	[SW1] Assessment of factual knowledge

Subject contents

Complex numbers. Matrices, system of linear equations. Vectors in three- dimensional space. The dot , and the cross product of vectors, their properties and applications. The scalar triple product of vectors, and its applications. Equations of a line and a plane in a space. Distance from a point to a plane. Angles between planes and lines. Limits and continuity of a function of several variables, partial derivatives, total differentia, extrema of functions of several variables, implicit functions. Double integral over a rectangle, and the normal domain, change of variables in a double integral. Applications of the double integral. Triple integral over a cuboid, and the normal domain. Change of variables in a triple integral. Applications of the triple integral. Scalar and vector Fields, Gradient of a scalar field, divergence and curl of a vector field, conservative field. Line integral of a scalar field, line integral of a vector field. Surface integral

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="2"></td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>90 minutes written exam, 3 tests, active participation during classes</td><td>50.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>W.Żakowski, W.Kołodziej , Matematyka czesc 2 Analiza Matematyczna, Wydawnictwa Naukowo- Techniczne, Warszawa 2003 W. Krysicki, L. Włodarski „Analiza matematyczna w zadaniach” PWN, Warszawa 1986 W. Stankiewicz „Zadania z matematyki dla wyższych uczelni technicznych”, PWN, Warszawa 1980,K.Jankowska, J.Jankowski, Zbior zadn z matematyki, Wydawnictwo Politechniki Gdańskiej Gdańsk 2003, K.Jankowska, J.Jankowski, Funkcje wielu zmiennych, całki wielokrotne, geometria analityczna, Wydawnictwo Politechniki Gdańskiej Gdańsk 2006, G.Kwiecińska, Matematyka część III Analiza funkcji wielu zmiennych.Wydawnictwo UG.M.Gewert, Z.Skoczylas, analiza matematyczna 2, Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS Wrocław 2004, M.Gewert, Z.Skoczylas, analiza matematyczna 2, Przykłady i zadania, Oficyna Wydawnicza GiS Wrocław 2004, T.Jurlewicz, Z.Skoczylas, Algebra liniowa, Definicje, twierdzenia, wzory, Oficyna Wydawnicza GiS Wrocław 2004, T.Jurlewicz, Z.Skoczylas, Algebra liniowa,Przykłady i zadania, Oficyna Wydawnicza GiS Wrocław 2004, J.Dymkowska, D. Beger „Rachunek całkowy w zadaniach" Wydawnictwo Politechniki Gdańskiej Gdańsk 2015, J.Dymkowska, D. Beger „Rachunek różniczkowy w zadaniach" Wydawnictwo Politechniki Gdańskiej Gdańsk 2015,</td></tr>
<tr><td>Supplementary literature</td><td>T. Jankowski „Matematyka. Podręcznik dla wydziałów elektrycznych i mechanicznych politechnik”, PWN, Warszawa 1967 W. Leksiński, I. Nabiałek, W. Żakowski „Matematyka. Definicje, twierdzenia, przykłady, zadania”-podręczniki akademickie , Wyd. NT, Warszawa 1994, K.Dobrowolska, praca zbiorowa „Matematyka dla studiów technicznych dla pracujących” Tom I, PWN, Warszawa 1981, R. Grzymkowski „Matematyka, zadania i odpowiedzi”, podręczniki akademickie, Wyd. Pracowni Komputerowej Jacka Skalmierskiego, Gliwice 2002 , M. Lassak „Zadania z analizy matematycznej”, Wyd. Wspierania Procesu Edukacji, Warszawa 2003</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Find the local extreme values of the function f(x,y)=x/(y+1)+8/x-y-1.
2. Compute the double integral of the given function f(x,y) over the region D.
3. Find the equation of the plane tangent to the surface S at the point P.
4. Show that the points A, B, C, D do not lie on the plane.
5. Discuss the relative position of the line l and the plane S.
6. Using cylindrical or spherical coordinates evaluate the given triple integral.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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