GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00052070
Field of study	Nanotechnology

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
			Subject group related to scientific research 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	Department of Differential Equations and Mathematical Applications -> Faculty of Applied Physics and Mathematics

Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Piotr Bartłomiejczyk
	Teachers	dr inż. Paweł Wojda
		dr hab. Piotr Bartłomiejczyk

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						
	Adresy na platformie eNauczanie:						
	Matematyka III ćwiczenia 2021 - Moodle ID: 13017 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13017						
	Matematyka III ćwiczenia 2021 - Moodle ID: 13017 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13017						

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	15.0	110.0	200

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_U01	The student appreciates the importance of expanding knowledge independently.	[SU2] Assessment of ability to analyse information
	K6_W02	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	

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

Recommended reading	Basic literature	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 2004
		G.M. Fichtenholz "Rachunek różniczkowy i całkowy" tom I, II, III
		L. 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 uczelni technicznych" 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	Matematyka III ćwiczenia 2021 - Moodle ID: 13017 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13017 Matematyka III ćwiczenia 2021 - Moodle ID: 13017 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13017

Example issues/ example questions/ tasks being completed	Compute the sum of the given series with general term an.
	Check whether the given series is convergent using the ratio test, the root test.. the comparison test or the integral test.
	Compute partial derivatives of the second order for the given function f(x,y) .
	Find extreme values of the function f(x,y).
	Compute the double integral of the given function f(x,y) over the region D.
	Find the total differential of the function f.
	Find the general solution of the differential equation..
	Find a particular solution of the differential equation ... satisfying the given initial conditions .
	Find the general solution of the differential equation . by the method of variation of parameters .
Work placement	Not applicable