



KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez
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Course title		ECTS code	
Mathematics		13.3.0455	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	pierwszego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	wszystkie
		specialization	wszystkie
Teaching staff			
dr Aleksandra Nowel; mgr Krzysztof Kowitz; mgr Marcin Staniszewski; mgr Klaudiusz Czudek; Marta Leśniak; dr Jacek Tryba; Marta Kwela; mgr Piotr Michalak; dr Milena Matusik; dr Ewa Tyszkowska; dr Michał Jabłonowski; dr Maciej Niebrzydowski; prof. UG, dr hab. Błażej Szepietowski; dr Marek Hałenda; mgr inż. Mateusz Gałka; dr Piotr Zarzycki; dr Piotr Bartłomiejczyk; mgr Gabriela Łuczyńska; dr Elżbieta Mrozek; dr Iwona Krzyżanowska; dr Michał Jabłonowski; dr Joanna Czarnowska; prof. UG, dr hab. Antoni Augustynowicz; dr Janusz Przewocki; dr Adam Kwela; dr Elżbieta Mrozek; dr Agnieszka Demby; dr Piotr Karwasz; mgr Paweł Bytner; mgr Dominik Horwat; dr Krzysztof Topolski; mgr Bartosz Kamedulski; dr Michał Stukow; dr Monika Wrzosek; mgr Rafał Perczyński			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		8	
Auditorium classes, Lecture			
The realization of activities			
classroom instruction			
Number of hours			
Lecture: 30 hours, Auditorium classes: 60 hours			
The academic cycle			
2022/2023 winter semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
<ul style="list-style-type: none"> - group work - problem-focused lecture 		Final evaluation	
		<ul style="list-style-type: none"> - Graded credit - Examination 	
		Assessment methods	
		<ul style="list-style-type: none"> - written exam with open questions - (mid-term / end-term) test - written exam (test) 	
		The basic criteria for evaluation	
		The credit from classes is obtained if more than 50% of the maximum sum of points from two tests is obtained.	
		The credit from lecture is obtained if a written exam is passed, one must get more than 50% of the maximum sum of points from the exam.	
		Criteria for grades in accordance with the University of Gdansk study regulations.	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
none			

B. Prerequisites	
none	
Aims of education	
Introduction to the elementary concepts of differential and integral calculus (real functions of one and many variables) and linear algebra; developing the skills to solve basic problems of higher mathematics (with achieving accounting skills in this area) to the extent necessary to understand and describe chemical and physical processes. Developing students' skills of abstract understanding of problems.	
Course contents	
<p>Introductory information and elementary functions (symbols of quantifiers, formula for the natural power of binomial, definition of real function and basic properties of functions, linear, quadratic, polynomial, rational, irrational, exponential and logarithmic functions, trigonometric and cyclometric functions)</p> <p>Sequence and limit of a sequence, limit and continuity of a function (definition of a numerical sequence, sequence properties, convergent sequences, proper and improper limit of a sequence, properties of limits, number e, proper and improper limit of a function at a point and infinity, right and left limits, continuity of a function at a point, continuous functions, properties of continuous functions)</p> <p>Derivative of a function (definition of a derivative of a function at a point, differentiable functions, derivative function, geometric interpretation, tangent equation, properties of differentiable functions, differentiation rules, higher order derivatives)</p> <p>Application of derivative, de l'Hospital theorem (monotonicity, local extreme, necessary and sufficient condition for existence of local extreme of differentiable function, global extremes, de l'Hospital theorem)</p> <p>Asymptotes, partial derivatives of functions of several variables (definition of oblique and vertical asymptotes, finding function asymptotes, partial derivative, local extremum of functions of two variables)</p> <p>Integral (primitive function, definition of integral, properties of integral, integration by parts, integration by substitution)</p> <p>Definite integral (definition of definite integral, properties of definite integral, geometric interpretation and application of definite integral)</p> <p>Multiple integrals (concept of multiple integral, normal areas, coordinate change in multiple integral)</p> <p>Matrix operations, matrix determinant, inverse matrix (matrix definition, matrix operations, matrix determinant, Sarrus formula, Laplace expansion, properties of determinants, singular matrix, invertible matrix, formula for inverse to nonsingular matrix)</p> <p>Complex numbers (field of complex numbers, algebraic, trigonometric and exponential form, conjugation, complex roots, de Moivre's formula)</p> <p>Linear spaces (definition of linear space, Euclidean spaces and Euclidean norm, spaces over the field of real and complex numbers, linear combination, linear dependence and independence of vectors)</p> <p>Linear space base, scalar product, transformation of linear spaces (base concept, vector's coordinates in the base, scalar product, orthogonality, linear operators and linear functionals)</p>	
Bibliography of literature	
<p>Bibliography of literature</p> <p>Literature required to pass the course</p> <p>T. Jurlewicz, Z. Skoczylas, Algebra liniowa 1. Przykłady i zadania</p> <p>M. Gewert, Z. Skoczylas, Analiza matematyczna 1. Przykłady i zadania</p> <p>G. Kwiecińska: Matematyka : kurs akademicki dla studentów nauk stosowanych. Cz. 1, Wybrane zagadnienia algebry liniowej</p> <p>G. Kwiecińska: Matematyka : kurs akademicki dla studentów nauk stosowanych. Cz. 2, Analiza funkcji jednej zmiennej</p> <p>W. Krysicki, L. Włodarski: Analiza matematyczna w zadaniach. 1 i 2</p> <p>Extracurricular readings</p> <p>Erich Steiner : „Matematyka dla chemików”, Warszawa, Wydaw. Naukowe PWN, 2001.</p> <p>Halina Pidek-Łopuszańska: „Matematyka dla chemików”, Wiedza Powszechna, Warszawa 1974.</p>	
The learning outcomes (for the field of study and specialization)	Knowledge
	<p>knows the basic symbols and mathematical symbols, transforms algebraic expressions</p> <p>classifies basic elementary functions and lists their properties</p> <p>lists basic formulas of differential and integral calculus and applies them to solving problems</p> <p>uses differential and integral calculus to study the properties of functions of one variable and many variables</p> <p>lists basic matrix calculus formulas</p> <p>knows the properties of linear spaces and can verify them</p>
	Skills
	<p>Is able to link the problem in the field of algebra and mathematical analysis and their applications with the relevant theoretical problem</p>
	Social competence
Contact	

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