

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	MATHEMATICS 2, PG_00061165								
Field of study	Management								
Date of commencement of studies	October 2023		Academic year of realisation of subject			2023/2024			
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			English			
Semester of study	2		ECTS credits			5.0			
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 inż. Magdalena Łapińska							
	Teachers dr inż. Magdalena Łapińska								
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	vject Seminar SUM		SUM	
of instruction	Number of study hours	30.0	30.0	0.0	0.0		0.0	60	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	60		11.0				125	
Subject objectives	Uses the apparatus of linear algebra and mathematical analysis to solve theoretical and practical problems occurring in social sciences								
Learning outcomes	Course outcome Subject outcome Method of verification					ication			
	[K6_W02] demonstrates comprehensive preparation in terms of methods, techniques for formulating and solving problems		uses a mathematical apparatus to solve economic problems, combining knowledge of mathematics with knowledge of social sciences			[SW1] Assessment of factual knowledge			
	[K6_U04] formulates logical solutions to complex or unstructured problems		integrates the information obtained from solving complex problems, interpreting them, drawing conclusions and formulating and justifying opinions			[SU2] Assessment of ability to analyse information			
Subject contents	Intervals of concavity, points of inflection Analysis of functions and their graphs. Examples of application of functions and derivatives in economics. Demand functions, logistic function, marginal cost, revenue and profit function. Elasticity of demand, the basic principle of economics. Infinite series. Partial sums, convergence of a series, geometric series, harmonic series. Convergence tests, p-series Integral calculus. Antiderivatives, indefinite integrals, the basic formulae. Integration by substitution. Integration by parts. Integration of rational functions. Definite integral. Properties of definite integrals. Integration by substitution and by parts in the case of definite integrals. Applications of definite integrals. Improper integrals Multivariable differential calculus. Functions of two or more variables, limits and continuity. Partial derivatives, differentiability and chain rules. Maxima and minima of functions of two variables. Absolute extrema on closed and bounded sets. Gradient. Lagrange method of multipliers. Repeated and double integrals. Probability, random variables Basic concepts in probability theory: definition of probability, axioms, joint probability, independence. Discrete random variable; probability density function. Continuous random variable, probability density function. Probability distribution function, expectations, variances and standard deviations Basic distributions of random variables The binomial distribution. Poisson distribution. Normal distribution								
Prereguisites									
and co-requisites									
Assessment methods and criteria	Subject passing criteria		Passing threshold			Percentage of the final grade			
	Homework assignments		0.0%			20.0%			
Final exam			50.0%			80.0%			

Recommended reading	Basic literature	Martin Anthony, Norman Biggs, Mathematics for Economics and Finance Methods and Modelling, Cambridge University Press ISBN: 0521559138 Ken Binmore and Joan Davies , CALCULUS: Concepts and methods, Cambridge University Press ISBN: 0521775418 T. Jankowski, Linear Algebra, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2001, ISBN 83-88007-87-4				
	Supplementary literature	Hwei Hsu, Schaum's Outline of Probability, Random Variables, and Random Processes, Second Edition, McGraw-Hill; 2 edition ISBN: 978-0071632898				
	eResources addresses	Adresy na platformie eNauczanie: WZIE - BiM - Mathematics 2 2023/24 (M.Łapińska) - Moodle ID: 35316 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35316				
Example issues/ example questions/ tasks being completed	 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=35316 Prove convergence of the series and find the sum. Is the given series absolutely convergent, conditionally convergent or divergent? Compute the improper integral or prove its divergence Find the area of the figure bounded by y=e^x, y=e^{2x}, x=1. Find the integral x³In x dx Find the points of extremum of the function f(x,y)= x²+xy+y²+x-y+1 Find the greatest and the least value of the function f(x,y)=x²-y² within the circle x²+y² 4. To find stationary points on the boundary of the domain use the method of relative extrema. Find the area of the indicated domain using double integration. The domain is bounded by the parabolas y=x, y=2x and straight line x=4. Given the probability function of the random variable X: p(-5)=0.1, p(-2)=0.2, p(0)=0.1, p(1)=0.2, p(3)=c p(8)=0.1 find: the distribution function and its graph (F(x)=P(X probabilities P(X=1), P(X=2), P(X<3), P(X<2), P(X 0), P(-2 X < 1), mean value variance and standard deviation Find: mean value, variance, the distribution function and P(X > 1) if the density function of the random variable X is of the form f(x)= 3/4(2x-x_2) if 0 x 2 and f(x)=0 otherwise. A consumer buys apples and bananas and has utility function u(x1,x2)=x1x2², where x1 is the number of apples and x2 the number of bananas. Suppose that he has \$1.80 to spend on the budget equations bananas, and that apples cost \$0.12 each, bananas cost \$0.20 each. Write down the budget equations 					
Work placement	Not applicable					

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