



Subject card

Subject name and code	Mathematics and Statistics, PG_00060636						
Field of study	Transport and Logistics						
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			Polish		
Semester of study	2	ECTS credits			8.0		
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 Lech Kujawski					
	Teachers	dr inż. Magdalena Kunicka dr Lech Kujawski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	45.0	0.0	15.0	0.0	90
	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	90	8.0		102.0	200	
Subject objectives	The aim of the subject is to enable the student to acquire competence in using basic mathematical analysis, descriptive and mathematical statistics, and applying the acquired knowledge to solve simple theoretical and practical problems encountered in engineering fields						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U02] can work individually and in a team, communicate using various techniques in a professional environment, as well as document, analyze and present the results of his work; can estimate the time needed to complete a given task	The student has knowledge in the field of mathematical analysis and differential equations. They can utilize the acquired concepts to solve problems related to modeling and interpreting mechanical systems, as well as manufacturing processes of devices.			[SU4] Assessment of ability to use methods and tools		
	[K6_W01] has well structured knowledge of mathematics, including algebra, elements of logic, geometry, mathematical analysis and probabilistics necessary to describe and analyze the operation of means and transport systems	The student understands the need for lifelong learning, can inspire, and organize the learning process for others			[SW1] Assessment of factual knowledge		

Subject contents	<p>Mathematics: Elements of Linear Algebra: matrices, determinants, matrix rank, systems of linear equations, Kronecker-Capelli theorem, Cramer's theorem, Gauss-Jordan elimination method. Integral calculus of functions of one variable: indefinite and definite integrals with applications, integration by parts and by substitution, integration of rational, trigonometric, and irrational functions. Limits and continuity of multivariable functions. Multivariable calculus: partial derivatives, total differential, extrema of functions of two variables. Double integral: over a rectangle, over a normal set, change of variables, polar coordinates, applications of double integral. Triple integral with applications.</p> <p>Statistics: Population and sample. Empirical distribution. Measures of central tendency and dispersion. Distribution of sample statistics. Central limit theorem. Graphical presentation of statistical data. Estimation (point and interval). Hypothesis testing: about mean, variance, proportion. Comparison of populations. Tests for two means, variances, and proportions. Correlation, sample correlation coefficient. Testing the significance of linear correlation coefficient. Test for two correlation coefficients. Spearman's rank correlation coefficient. Kendall's rank correlation coefficient. Regression, testing the significance of regression coefficient. Analysis of variance in regression, interval estimation in regression analysis, confidence curves. Analysis of variance. Experimental factor, experimental unit, experimental design. Completely randomized design. One-way classification model. Multiple comparison tests (Student's t-test (Fisher's method), Tukey's test, Scheffé's test). Nonparametric tests for independence, conformity, randomness of the sample.</p>		
Prerequisites and co-requisites	Knowledge of the material from the Mathematics I course conducted in the first semester		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		50.0%	100.0%
Recommended reading	Basic literature	Brak	
	Supplementary literature	Brak	
	eResources addresses	Podstawowe https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36905 - Uzupełniające Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		