GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Practical Mathematics, PG_00040997		
Field of study	Transport		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
Education level	second-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	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Railway Engineering -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Anita Milewska	
	Teachers	dr Anita Milewska	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	30.0	0.0	0.0	0.0	45
	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	45	10.0	45.0	100

Subject objectives	To acquaint the student with the method of solving ordinary differential equations and systems of differential equations, using the Laplace transformation. To acquaint the student with the concepts of analytical geometry and differential geometry in space. To familiarize the student with the concepts of random variable, preparing for the implementation of the subject related to the reliability of transport systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U05] able to apply an extended mathematical apparatus, mathematical models and computer simulations to describe complex technical processes in transport, model the relations which occur in transport and analyse, design and assess the operation of transport systems	The student uses a mathematical tools needed to describe problems appearing in transport, can use the Laplace transformation, the concepts of analytical geometry and differential geometry, needed to analyze the problems occurring in transport.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K7_U06] able to integrate knowledge of mathematics, physics, electronics, power engineering, traffic engineering, civil engineering of transport and other fields by applying a system based approach, including non-technology aspects (economics, psychology, sociology, environment, health and safety), able to define the effect these fields have on the development of transport systems, able to use new technical and technological achievements and assess their utility for transport	The student is able to recognize the relationship of engineering issues with relevant issues in the field of mathematics, kinematics and apply the appropriate method of solving the task.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K7_W01] has broad and advanced knowledge of some of the branches of mathematics including calculus of probability, mathematical statistics and numerical methods used to formulate, solve and verify complex transport problems	The student knows the mathematical apparatus needed to describe problems appearing in transport, knows the Laplace transformation, concepts related to random variable, analytical geometry and differential geometry, needed to analyze issues occurring in transport.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

Subject contents

Random variables and their parameters. Distributions of discrete and continuous (one-dimensional) random variables. Independence of random variables. Laplace transformation with the use to solve ordinary differential equations and systems of differential equations. Selected problems from analytical geometry. Plane and straight in 3-dimensional space. Equations of the plane; distance of the point from the plane; equation of a straight line; parametric representation of a straight in space; straight as the edge of the intersection of two planes. Vector function and description of point motion in space. Frenet trihedron.

Prerequisites and co-requisites

Knowledge from the subject Mathematics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Test No. 1 during the course	55.0%	25.0%
Test No. 2 during the course	55.0%	25.0%
Exam	55.0%	50.0%

Recommended reading

Basic literature	W. Żakowski, W. Leksiński, Matematyka, cz. IV, WNT, Warszawa 2000. H. Goering, Elementarne metody rozwiązywania równań różniczkowych, PWN, Poznań 1967. W. Krysicki, J. Bartos i inni, Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach, PWN, Warszawa 1995. J. Jakubowski, R. Sztencel, Wstęp do teorii prawdopodobieństwa, Script, Warszawa 2001. F. Leja: "Geometria analityczna", PWN 1972.
Supplementary literature	G.M. Fichtenholz, Rachunek różniczkowy i całkowy, t. 1, 2 i 3 Wydawnictwo Naukowe PWN, Warszawa 2002 (t. 1 i 2), 2003 (t. 3).
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Solve the differential equation with conditions. Give the kinematic interpretation of the second derivative of the vector function. Determine the standardized random variable. Examine the curve of the vector function hodograph.
Work placement	Not applicable