



Subject card

Subject name and code	RELIABILITY AND SAFETY OF TRANSPORTATION SYSTEMS, PG_00045918						
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			assessment		
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 inż. Łukasz Mejłun dr Anita Milewska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	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	The student has the necessary knowledge needed to assess the reliability of renewable systems and their safety, including transport systems.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U08] able to diagnose the operation of a transport system, it's facilities, processes and services, identify necessary improvements to the transport system, apply basic traffic modelling to forecast passenger and freight transport	Student is able to determine the characteristics of renewable systems, assess readiness, reparability and security of transport system.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		
	[K7_W07] has broad knowledge of the reliability and safety of transport systems and transport-related environmental protection	The student knows the reliability characteristics of renewable systems, has knowledge about the security of transport systems.			[SW1] Assessment of factual knowledge		
Subject contents	A reminder of the basic concepts of reliability of non-renewable systems. Parameters and functional characteristics of the reliability of renewable systems. Development of a reliability test program - requirements and guidelines. Problems of systems security, including transport systems.						
Prerequisites and co-requisites	Knowledge of probabilistics, mathematical statistics, Laplace transformation, transport systems, basics of reliability of non-renewable elements, basics of safety.						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Passing the tutorials (passing the colloquium on reliability and passing the self-performed security task)	60.0%			35.0%		
	Passing lectures (in writing)	55.0%			65.0%		

Recommended reading	Basic literature	W. Zamojski: Teoria i technika niezawodności. Wrocław 1976. D. Bobrowski: Modele i metody matematyczne teorii niezawodności w przykładach i zadaniach. WNT Warszawa 1985. T. Szopa: Niezawodność i bezpieczeństwo. Ofic. Wydawnicza Politechniki warszawskiej, warszawa 2009.
	Supplementary literature	F. Grabski, J. Jaźwiński: Funkcje o losowych argumentach w zagadnieniach niezawodności, bezpieczeństwa i logistyki. WKŁ Warszawa 2009.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>Determine the reliability of a system consisting of five elements, in which each subsequent element is put into operation after the failure of the previous element.</p> <p>Determine the intensity of damage to the third damage.</p> <p>Structural reliability.</p> <p>Develop a reliability test program.</p> <p>Specify the values necessary for probabilistic description of systems with protection devices.</p>	
Work placement	Not applicable	