



Subject card

Subject name and code	Safety and risk in transportation systems, PG_00064985						
Field of study	Safety and risk in transportation systems						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2025/2026		
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	2		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Transport and Logistics -> Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Jakub Montewka				
	Teachers		prof. dr hab. inż. Jakub Montewka mgr inż. Filip Zarzycki				
Lesson types	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						
	eNauczanie source addresses: Moodle ID: 2232 Safety and risk in transportation systems, ćwiczenia, sem. zimowy 2025/2026 https://enauczanie.pg.edu.pl/2025/course/view.php?id=2232						
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 aim of this course is to familiarise students with methods used for risk assessment and safety assurance in complex socio-technical systems, with particular emphasis on maritime transport systems. In topics related to risk analysis, the Formal Safety Assessment (FSA) methodology and its extension, the risk-based design methodology, will be presented. In topics concerning safety, methods from the Safety I and Safety II groups will be discussed, including basic theories of accident analysis and selected methods for human reliability assessment (HRA). The theoretical material will be supplemented with appropriate examples of practical applications.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U01] utilizes acquired methods, tools and mathematical models for analysis and evaluation of transport systems and processes	The student is able to apply in practice the knowledge gained during the course. The student knows and can use a tool for quantitative risk assessment.	[SU4] Ocena umiejętności korzystania z metod i narzędzi
	[K7_W02] demonstrates structured and theory supported knowledge encompassing key issues in the field of Transport and Logistics, enabling modeling and analysis of transport systems and processes	The student possesses knowledge of methods used for risk assessment, estimation, and ensuring safety in human-technical systems.	[SW1] Ocena wiedzy faktograficznej
	[K7_W01] explains and describes, based on general knowledge in the field of scientific disciplines forming the theoretical foundations of Transport and Logistics, the construction and principles of operation of transport systems, processes and their components, as well as methods and means of their integration	The student is able to identify the area of applicability for the methods presented in the classes and point out the significant differences between the methods.	[SW1] Ocena wiedzy faktograficznej
	[K7_U02] formulates and tests hypotheses concerning problems of transport systems and processes, as well as simple research problems	The student is able to formulate a research problem related to a simple issue concerning a transport system and can construct a simple mathematical model to solve this problem.	[SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania
Subject contents	Course content – lecture		
	1. Theoretical foundations related to the concept and definition of risk, adopted scientific approaches, and the presentation of risk analysis as a tool facilitating the decision-making process. 2. Presentation of an exemplary methodological framework for quantitative risk assessment, along with examples. 3. The Formal Safety Assessment methodology. 4. Methods for safety assessment belonging to the Safety II group (STAMP, FRAM). 5. The NARA method for assessing human reliability.		
	Course content – exercises Bayesian networks as a tool for mathematically modeling cause-and-effect relationships in systems subject to uncertainty.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		55.0%	50.0%
		55.0%	50.0%
Recommended reading	Basic literature	Rausand, Marvin, and Stein Haugen. Risk Assessment - Theory, Methods, and Applications (2nd Edition). 2nd edition. Hoboken, NJ: John Wiley & Sons, 2020. Web.	
	Supplementary literature	Erik, Hollnagel. FRAM: The Functional Resonance Analysis Method: Modelling Complex Socio-Technical Systems. 1st ed. Farnham: Routledge, 2012. Web.	
	eResources addresses	Basic https://katalogbpg.pg.edu.pl/permalink/48FAR_PGD/15ejvo2/cdi_askewsholts_vlebooks_9781119377283 - Book Supplementary https://katalogbpg.pg.edu.pl/permalink/48FAR_PGD/15ejvo2/cdi_askewsholts_vlebooks_9781409445531 - Book	

Example issues/ example questions/ tasks being completed	
Practical activities within the subject	Not applicable

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