



Subject card

Subject name and code	Safety and risk in transportation systems, PG_00057094						
Field of study	Transport and Logistics						
Date of commencement of studies	February 2022	Academic year of realisation of subject			2021/2022		
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	Zakład Projektowania Okrętu -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jakub Montewka					
	Teachers	dr hab. inż. Jakub Montewka mgr inż. Izabela Szwoch					
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						
	Safety and risk in transportation systems W/C, 1 sem., TiL, letni 21/22 (PG_00057094) - Moodle ID: 23607 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23607						
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	9.0		46.0	100	
Subject objectives	The objective of this course is to get the students acquainted with the foundations of risk analysis as a scientific discipline, along with the practical approaches to risk analysis as a task in a context of risk-informed decision making process.						
	The students will be acquainted with the Quantitative Risk Assessment (QRA), HazId tools, risk-informed decision making, human reliability analysis techniques (HRA), basic tools for QRA such as Bayesian Belief Network, Fault Tree or Event Tree.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W03] The student has extensive knowledge of: reliability and safety of transport systems and environmental protection in transport	The student knows the issues related to risk analysis. He is able to formulate a scientific problem related to risk analysis and propose its solution at a certain level of generality. The student is able to carry out a risk analysis for a simple anthropotechnic system.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K7_U04] The student is able to use the known methods and mathematical models, as well as computer simulations to analyze, design and evaluate the functioning of transport systems or their components	The student is able to determine the scope of knowledge necessary to carry out the risk analysis of a simplified anthropotechnical system and indicate the source of this data, including mathematical models and computer simulations.	[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_K82] is equipped to participate actively in lectures, seminars and laboratory classes conducted in foreign language	N/A	[SK1] Assessment of group work skills
	[K7_W05] The student has extensive knowledge of law, economics and transport management	N/A	[SW1] Assessment of factual knowledge
[K7_W06] The student has an extensive knowledge of transport systems and the principles of transport systems integration	N/A	[SW1] Assessment of factual knowledge	
Subject contents	<ol style="list-style-type: none"> 1. Theoretical foundations of risk analysis. 2. Quantitative risk analysis, Hazard identification. 3. Human Reliability Assessment techniques. 4. Bayesian Networks, Fault Tree, Event Tree. 5. Safety assessment methods. 		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Assignment pass	51.0%	50.0%
	Lecture pass	51.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Aven T. "Quantitative risk assessment. The scientific platform". Cambridge, 2011. 2. Aven T., Risk assessment and risk management: Review of recent advances on their foundation, European Journal of Operational Research, Volume 253, Issue 1, 2016, Pages 1-13, https://doi.org/10.1016/j.ejor.2015.12.023 3. Goerlandt F., Montewka J., Maritime transportation risk analysis: Review and analysis in light of some foundational issues, Reliability Engineering & System Safety, Volume 138, 2015, Pages 115-134, https://doi.org/10.1016/j.res.2015.01.025. 4. MSC-MEPC.2-Circ.12-Rev.2 - Revised Guidelines For Formal Safety Assessment (Fsa) For Use In The Imo Rule-Making Proces... (Secretariat).pdf 	
	Supplementary literature	<ol style="list-style-type: none"> 1. Galavotti, M.C. The Interpretation of Probability: Still an Open Issue? <i>Philosophies</i> 2017, 2, 20. https://doi.org/10.3390/philosophies2030020 2. Aven T, The risk concept historical and recent development trends, Reliability Engineering & System Safety, Volume 99, 2012, Pages 33-44, https://doi.org/10.1016/j.res.2011.11.006. 3. http://c4tx.org/ctx/pub/fsa.pdf 4. Wróbel K., Montewka J., Kujala P., System-theoretic approach to safety of remotely-controlled merchant vessel, Ocean Engineering, Volume 152, 2018, Pages 334-345, https://doi.org/10.1016/j.oceaneng.2018.01.020. 	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Definition of risk and scientific approaches to risk analysis. 2. Application of Bayesian Networks in the risk analysis process. 3. Risk analysis process - elements, data sources, methods and models. 		
Work placement	Not applicable		