

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Risk and reliability of systems, PG_00065614								
Field of study	Naval Architecture and Offshore Structures								
Date of commencement of studies	February 2026		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	1		ECTS credits			4.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Division of Marine Power Plants -> Institute of Naval Architecture -> Faculty of Mechanical Enginee Ship Technology -> Wydziały Politechniki Gdańskiej					neering and			
Name and surname	Subject supervisor		dr inż. Roman Liberacki						
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	30.0	0.0	0.0	30.0		0.0	60	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	60		10.0		30.0		100	
Subject objectives	Introducing students to methods of reliability assessment and risk analysis of technical systems.								
Learning outcomes	Course outcome		Subject outcome Method of veri				fication		
	[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving		The student understands and can perform a professional risk analysis related to technical systems. He/she can critically verify the acquired knowledge and utilize expert opinions in case of difficulties in independently solving a problem.			[SK5] Assessment of ability to solve problems that arise in practice			
	[K7_U03] identifies and formulates task specifications in the scope of shipborne and offshore systems/ processes design, including non- standard problems also accounting for their non-technical aspects		The student identifies and formulates tasks and solves them in the context of system design, taking into account their safety. He/ she also considers atypical aspects such as the human factor.			[SU1] Assessment of task fulfilment			
	[K7_K12] is ready for fullfiling social commitement and initation of actions for public interest including entrepreneurial thinking and acting		The student understands the social role and the necessity of striving to minimize risks while maintaining a reasonable approach to the associated costs and benefits.			[SK5] Assessment of ability to solve problems that arise in practice			
	[K7_W11] interprets social, economic, legal (including industrial and intellectual property laws), and other non-technical aspects of engineering activities, and includes them into engineering practice		The student interprets the economic and legal conditions for safety assessment and incorporates them into engineering practice.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge			

Subject contents	LECTURES: Concept of reliability, reliability indicators, mathematical models for assessing the reliability of elements and systems. Statistical hypothesis testing. Maintainability and availability of technical systems. Human factors. Methods for assessing the probability of human errors. Concept of risk, risk measures, mathematical models for risk assessment. ALARP criterion. Formal Safety Assessment (FSA) method in shipping. Safety management.						
Prerequisites and co-requisites	Basic knowledge of the construction and operation of machines and devices.						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Written test	50.0%	50.0%				
	Project	100.0%	50.0%				
Recommended reading	Basic literature	 Girtler J., Kuszmider S., Plewiński L.: Wybrane zagadnienia eksploatacji statków morskich w aspekcie bezpieczeństwa żeglugi. WSM, Szczecin 2003. Gołąbek A.: Wybrane zagadnienia bezpieczeństwa maszyn. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2002. Guidelines for Formal Safety Assessment (FSA) for Use in The Imo Rule-Making Process, International Maritime Organization 2002. Radkowski S.: Podstawy bezpiecznej techniki. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2003. Brandowski A., Metodyka formalnej oceny bezpieczeństwa statku (FSA), I-sza Międzynarodowa Szkoła Letnia Bezpieczeństwo na Morzu, Politechnika Gdańska, Gdańsk 2001. Normy: OHSAS 18001:2007 ISM CODE SPIS CODE 					
	Supplementary literature	1. Modarres M., What every engineer should know about Reliability and Risk Analysis, Center for Reliability Engineering, University of Maryland, College Park, Maryland, Marcel Dekker, Inc., New York, Basel, Hong Kong, 1993.					
	eResources addresses						
Example issues/ example questions/ tasks being completed	1. Define reliability from a probabilistic perspective.2. Explain the ALARP risk criterion and its significance.3. List the stages of the FSA method.4. Conduct a risk analysis of a selected technical object.						
Work placement	Not applicable						

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