



Subject card

Subject name and code	Reliability, Safety and Risk Analysis, PG_00041721						
Field of study	Ocean Engineering						
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			English	
Semester of study	1		ECTS credits			3.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Ship and Land Based Power Plants -> Faculty of Ocean Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Roman Liberacki				
	Teachers						
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		5.0		25.0	75
Subject objectives	The aim of the course is to provide students with: the term of reliability, the term of availability, the term of safety and risk, risk measures, risk criteria, the impact of human factors on the risk, qualitative and quantitative methods of risk assessment, stages of formal safety assessment (FSA), the procedures and technical means taken to ensure safety in shipping.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W03] has a widened knowledge in the range of reliability and safety of ocean technology objects and systems and environmental protection in ocean technology		The student describes the basic definitions connected with the discipline: safety and reliability of systems. The student knows the models used to assess the reliability of components and systems and methods of risk assessment.		[SW1] Assessment of factual knowledge		
	[K7_U02] can plan and conduct research experiments on selected problems in ocean technology using various research methods		The student is able to perform the FMEA. The student is able to analyze safety of system in accordance with the FSA method.		[SU1] Assessment of task fulfilment		
[K7_K04] can properly define the priorities for the realization of a specified objective or task, can correctly identify and solve dilemmas associated with the job		The student can apply the ALARP rule in risk management.		[SK5] Assessment of ability to solve problems that arise in practice			
Subject contents	The qualification of reliability, reliability coefficients, mathematical models of valuations of the units and systems reliability. The human factor. Method of the valuation of the probability of the human errors. The terms of safety and risk. Risk as a measure of safety. The criteria for acceptable risk. Qualitative and quantitative methods of risk assessment. Formal safety assessment (FSA). Procedures and technical means taken to ensure safety in shipping. Ways to reduce the negative effects of the accident at sea.						
Prerequisites and co-requisites	No requirements.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Written midterm colloquium		50.0%		100.0%		

Recommended reading	Basic literature	<p>1. Melnick E.: Encyclopedia of Quantitative Risk Analysis and Assessment. Wiley & Sons. 2008.</p> <p>2. Modarres M.: What Every Engineer Should Know about Reliability and Risk Analysis. New York, 1993.</p> <p>3. Swain A.D., Guttman H.E.: Handbook of Human Reliability Analysis with Emphasis on Nuclear Power Plant Applications. Final Report, prepared for U.S. Nuclear Regulatory Commission. August, 1983.</p> <p>4. IMO (MSC 66/INF.8): A methodology for formal safety assessment of shipping. 1996.</p> <p>5. ELECTRONIC RELIABILITY DESIGN HANDBOOK. MIL-HDBK-338B. 1 October 1998. Department of Defence USA.</p> <p>6. Massimo Lazzaroni, Loredana Cristaldi, Lorenzo Peretto, Paola Rinaldi, and Marcantonio Catelani.: Reliability Engineering. Basic Concepts and Applications in ICT. 2011 Springer-Verlag Berlin Heidelberg.</p>
	Supplementary literature	No recommendations.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>1. Explain what is the ALARP rule in risk assessment.</p> <p>2. List and discuss the five steps of FSA method.</p> <p>3. Create a Fault Tree for a given top event.</p>	
Work placement	Not applicable	