



Subject card

Subject name and code	Risk Management, PG_00073089						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	first-cycle studies		Subject group				
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		1.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Division of Manufacturing and Production Engineering -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Ewa Kozłowska				
	Teachers		dr inż. Ewa Kozłowska				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 8465 Risk Management [W] MiBM (Eng.) sem1 zima 2026/2027 https://enauczanie.pg.edu.pl/2025/course/view.php?id=8465						
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	15		0.0		0.0	15
Subject objectives	The mian objective of the course is to familiarize students with modern methods and tools used for risk identification, assessment, analysis, and control, as well as safety assurance in complex socio-technical and organizational systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_K71] is able to explain the need to apply knowledge from the humanities, social sciences, economics, or law to solve problems		The student possesses general knowledge of the social, legal, and economic aspects of risk management, including regulatory compliance, liability issues, and the impact of organizational culture on system safety.		[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice		
	[K6_U71] is able to apply knowledge from humanities, social sciences, economics, or law to solve problems		The student can apply principles of social sciences and economics to analyze human behavior, support decision-making under uncertainty, and evaluate the financial and legal consequences of risks in organizations.		[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		
	[K6_W71] has general knowledge in the fields of humanities, social sciences, economics, or law, including their fundamentals and applications		The student can justify the importance of considering human, legal, and economic dimensions in decision-making and in building a safe, resilient, and responsible organizational environment.		[SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture Foundations and Architecture of Risk Management: Theoretical concepts, evolution of risk definitions, uncertainty, vulnerability, and system resilience. The role of risk management in organizational strategy and decision-making. Risk Management Frameworks and Standards: Overview of international frameworks (e.g., ISO 31000, COSO ERM) and formal quantitative risk assessment procedures. Risk-Based Approaches: Risk-informed design, operational decision-making, and risk-based resource allocation (Risk-Based Decision Making). Evolution of Safety Engineering (Safety-I vs. Safety-II): Safety-I: Traditional root cause analysis, error identification, and system component reliability. Safety-II: System performance under variability, resilience engineering, and proactive safety assurance. Modern systemic accident modeling and analysis methods (e.g., STAMP/STPA, FRAM). Human and Organizational Factors: Human Reliability Assessment (HRA) methods (e.g., NARA, HEART, SPAR-H), human error taxonomy, and safety culture in organizations.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test	51.0%	100.0%
Recommended reading	Basic literature	1. Rausand, M., Haugen, S. <i>Risk Assessment: Theory, Methods, and Applications</i> , 2nd Edition, John Wiley & Sons, 2020. 2. Aven, T. <i>Risk Analysis</i> , 2nd Edition, John Wiley & Sons, 2015. 3. ISO 31000:2018 <i>Risk management – Guidelines</i>	
	Supplementary literature	1. Hollnagel, E. <i>FRAM: The Functional Resonance Analysis Method: Modelling Complex Socio-Technical Systems</i> , Routledge, 2012. 2. Hollnagel, E. <i>Safety-I and Safety-II: The Past and Future of Safety Management</i> , Ashgate, 2014. 3. Leveson, N. <i>Engineering a Safer World: Systems Thinking Applied to Safety</i> , MIT Press, 2012.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	• Safety-I vs. Safety-II: Explain the differences between reactive (<i>Safety-I</i>) and proactive (<i>Safety-II</i>) safety paradigms and their impact on incident analysis. • Bayesian Networks: Discuss the application of Bayesian Networks for risk modeling under uncertainty and data scarcity. • Human Reliability Assessment (HRA): Describe a selected HRA method (e.g., NARA, HEART) and its role in estimating human error probabilities. • Traditional vs. Systemic Methods: Compare traditional risk methods (e.g., FTA, FMEA) with systemic approaches (e.g., FRAM, STPA), highlighting the benefits of systemic modeling.		
Practical activities within the subject	Not applicable		

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