



Subject card

Subject name and code	Degradation Failure of Machines and Devices, PG_00039927						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group			Optional subject group 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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Materials Engineering and Bonding -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Krzysztof Krzysztofowicz					
	Teachers	dr inż. Krzysztof Krzysztofowicz dr inż. Jacek Haras					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	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		0.0	50	
Subject objectives	Aim of subject is to present the students types and mechanisms of exploitation wear of machine parts and devices. Methods and techniques of wear reduction will be stressed.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W08] possesses basic knowledge including the methodology of designing machine parts, mechanical devices, selection of construction materials, manufacturing and operation, with the lifetime cycle	has basic knowledge			[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U11] is able to analyse the operation of devices and compare the construction solutions applying usage, safety, environmental, economic and legal criteria	is able to do analysis			[SU5] Assessment of ability to present the results of task		
Subject contents	Exploitation and wear of machines and devices. Exploitation environment and its organization. Influence of surface layer on the wear resistance of products. Types and mechanisms of machine parts wear. Natural and failure wear. Tribological and non-tribological wear (electrochemical corrosion, erosion, cavitation). Synergical influence of exploitation parameters on the wear process. Methods for reduction of wear of machine parts and devices (materials selection, design approach, surface and volume material properties change).						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Essay	50.0%			50.0%		
	Colloquium	50.0%			50.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Wranglen G.: Podstawy korozji i ochrony metali. WNT. Warszawa 1985. 2. Dobrzański L.A.: Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie i podstawy projektowania materiałowego. WNT. 2002. 3. Burakowski T., Wierzchoń.: Inżynieria powierzchni metali. WNT. Warszawa 1995. 4. Wyrzykowski J. W., Pleszakow E., Sieniawski J.: Odształcanie i pękanie metali. WNT. Warszawa 1999. 5. Hernas A., Dobrzański J.: Trwałość i niszczenie elementów kotłów i turbin parowych. Gliwice 2003.
	Supplementary literature	Engineering Failure Analysis
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Zużycie eksploatacyjne maszyn i urządzeń , W, TMiMK, sem.06 (PG_00039927) - Moodle ID: 29659 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29659</p> <p>Zużycie eksploatacyjne maszyn i urządzeń , W, TMiMK, sem.06 (PG_00039927) - Moodle ID: 29659 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29659</p>
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Wear process 2. Corrosion 3. Cavitation 4. Surface layer modification 	
Work placement	Not applicable	