



Subject card

Subject name and code	Operational Wear of Machines Devices, PG_00055507						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2023/2024		
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	Zakład Materiałoznawstwa I Technologii Materiałowych -> Institute of Manufacturing and Materials Technology -> 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	15.0	0.0	15.0	0.0	0.0	30
	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	30		2.0		18.0	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_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		
[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			
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., Wierchoń.: 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	<ol style="list-style-type: none"> 1. Thanapalan K: Engineering Failure Analysis Intech Open 2020 2. Hani M. Tawancy, Anwar UI-Hamid, Nureddin M. Abbas: Practical Engineering Failure Analysis CRC Press 2004 3. Sachs P.E, NevilleW.:Practical Plant Failure Analysis Taylor and Francis Group 2021
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>Zużycie eksploatacyjne maszyn i urządzeń, W, MiBM, sem.6, letni, 2023/24 - Moodle ID: 36876 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36876</p> <p>Zużycie eksploatacyjne maszyn i urządzeń, W, MiBM, sem.6, letni, 2023/24 - Moodle ID: 36876 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36876</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	