



## Subject card

Subject name and code	Contemporary directions of development in mechanical engineering, PG_00060401						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group					
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jerzy Głuch					
	Teachers	dr hab. inż. Jerzy Głuch					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	18.0	0.0	0.0	0.0	0.0	18
	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	18	0.0	0.0	18		
Subject objectives	Raising knowledge of students in modern directions of research and directions of development in the discipline Mechanical Engineering						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W11] possesses organized knowledge useful in understanding ex-technical conditioning connected with performing the profession of an engineer and taking it into consideration in engineering practice; possesses well-established knowledge within the range of intellectual property, management and organization of manufacturing processes, including the management and life-cycle of a product	The student understands the directions of research and directions of development of science, industry and their impact on society. It takes into account knowledge in the field of intellectual property, management and organization of manufacturing processes.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	[K7_U02] is able to communicate in English in professional matters within the area of technical science and, particularly, of construction and operation of machines	The student is able to discuss in a foreign language about the problems of technology and technology, especially in the discipline of mechanical engineering.			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		
Subject contents	Introduction. The role of mechatronics. Hybrid drive. Application of artificial intelligence (AI) methods. New materials. Bionics. Future development paths.						
Prerequisites and co-requisites	Knowledge of mechanics, fluid mechanics and thermodynamics.						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	report in English	100.0%			100.0%		

Recommended reading	Basic literature	<p>Bąkowski K.: Gas networks and installations PWN.</p> <p>Tesch K.: Fluid mechanics, Wyd. Gdańsk University of Technology, Gdańsk 2008</p> <p>Heynert H. General Bionics WNT Warsaw, 1975;</p> <p>Benyus J. Innovation inspired by nature. Biomimicry Perennial. New York; 2002;</p> <p>Morecki A. Bionic manipulators WNT Warsaw, 1976;</p> <p>Perycz S., Steam and gas turbines, Gdańsk University of Technology, Skrypt, Gdańsk 1988</p> <p>Kosowski K, Ship Turbine Power Plans, Wyd. PG Delft University, Gdańsk 2004</p> <p>Kosowski K, Introduction to the theory of marine turbines, Wyd. PG Delft University, Gdańsk 2004</p> <p>Allen Bursley Heat Engines Steam, Gas, Steam Turbines and their Auxiliaries</p> <p>Jakubik A., Non-mechanical damage of thermal equipment of power plants, WNT, Warsaw 1974.</p> <p>Gajewski T., Lesikiewicz A., Szymanik R., Przepływowe silniki odjetowe, WNT, Warszawa 1975.</p> <p>K. Gajewski, Turbine car drives, WNT, Warsaw 1978.</p> <p>Miller A., Lewandowski J., Gas-steam power plants, WNT, Warsaw 1999.</p> <p>Orłowski Z., Diagnostyka w życie turbin steamowych, WNT, Warszawa 2001.</p> <p>Walczyk Z., Kiciński J., Dynamics of power turbines, Wydawnictwo PG, Gdańsk 2001.</p> <p>Fletcher C.A.J. Computational Techniques for Fluid Dynamics</p> <p>Ferziger J.H, Peric M. Computational Methods for Fluid Dynamics</p> <p>Domachowski Z.: Automatic regulation of thermal turbine sets. Gdańsk University of Technology Publishing House, Gdańsk, 2011,</p> <p>Ziembik A., Energy economy, Silesian University of Technology Script, Gliwice 1992.</p> <p>Augustyn J.: Intelligent measurement cards in fast diagnostic systems, Pomiary Automatyka Kontrola, No. 2/1999, pp. 5-7.</p> <p>Boczek F., Dyrda B.: Operational calculations PERFORMANCE CALCULATION, Energetyka No. 12/1996, pp. 703-707.</p>
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	Supplementary literature	<p>Domachowski Z.: Automatic regulation of thermal turbine sets. Gdańsk University of Technology Publishing House, Gdańsk, 2011,</p> <p>Ziembik A., Energy economy, Silesian University of Technology Script, Gliwice 1992.</p> <p>Augustyn J.: Intelligent measurement cards in fast diagnostic systems, Pomiary Automatyka Kontrola, No. 2/1999, pp. 5-7.</p> <p>Boczek F., Dyrda B.: Operational calculations PERFORMANCE CALCULATION, Energetyka No. 12/1996, pp. 703-707.</p> <p>Bolikowski J.: Intelligent measurement transducers in the diagnostics of industrial processes, In: (Materials) II National Conference DPP97, Łagów, 8-11, September, 1997, pp. 37-42.</p> <p>Boroń W.: Characteristics of decentralized control systems, Pomiary Automatyka Kontrola nr 6/1998, pp. 203-206.</p>
	eResources addresses	<p>Adresy na platformie eNauczanie: Contemporary directions of development in mechanical engineering kopia 1 - Moodle ID: 35890 <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=35890">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=35890</a></p>
Example issues/ example questions/ tasks being completed	<p>Describe artificial intelligence methods in mechanical engineering</p> <p>Application of bionics in mechanical engineering</p>	
Work placement	Not applicable	