GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Exploitation of mechatronics devices, PG_00064785		
Field of study	Mechatronics		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2026/2027
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	Polish
Semester of study	1	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ryszard Jasiński	
	Teachers	dr hab. inż. Ryszard Jasiński dr inż. Paweł Załuski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	20.0	0.0	20.0	20.0	0.0	60

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	60	16.0	49.0	125

Subject objectives

To familiarize students with the operation of typical mechatronic devices.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W01] explains and describes, based on general knowledge in the field of scientific disciplines forming the theoretical foundations of Mechatronics, the construction and principles of operation of mechatronic systems, processes and their components, as well as methods and means of their integration	Student is able to identify and formulate a specification of tasks in the design and operation of mechatronic devices. Student explains and describes, based on general knowledge of the scientific disciplines that form the theoretical foundations of mechatronics, the structure and principles of operation of mechatronic systems and processes, and the operation of mechatronic devices.	[SW3] Assessment of knowledge contained in written work and projects
[K7_W11] interprets social, economic, legal (including industrial and intellectual property laws), and other non-technical aspects of engineering activities, and includes them into engineering practice	Student understands the need to formulate and provide the public with information and opinions regarding the operation of mechatronic devices.	[SW3] Assessment of knowledge contained in written work and projects
[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving	The student uses expert sources and critically evaluates solutions applied in mechatronic systems and during its operation.	[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice

Subject contents	Course content – lecture Introduction to the operation of mechatronic devices. Diagnostics of hydraulic (hydrotronic) systems. Measurement systems. Hydraulic fluids - operation of hydraulic (hydrotronic) systems. First start-up of a hydraulic (hydrotronic) system. Cleaning the hydraulic (hydrotronic) system from contamination (flushing the hydraulic system). Operation of hydraulic (hydrotronic) devices and systems in various environmental conditions. Methods for determining the areas of parameters for correct or incorrect operation of the hydraulic (hydrotronic) unit and system. Safe start-up and operation of mechatronic machines and devices. Directives on machine safety and user labor protection. Responsibility for a dangerous product. Hazard identification. Safe design. Technical protective measures. Safe work with mechatronic devices and systems.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	56.0%	25.0%
	56.0%	50.0%
	56.0%	25.0%

Recommended reading

Basic literature

1. James B. Hannon, ExxonMobil Corporation, Performance evaluation of new and in-service turbine oils. Practicing Oil Analysis Magazine

2. Przewodnik Bezpieczne Maszyny. Bezpieczna maszyna w sześciu krokach. SICK

3. Jarosław Biały, Marian J. Łopatka: Wybrane problemy doboru czynnika roboczego w hydrostatycznych układach napędu i sterowania

4. Vademecum hydrauliki, Rexroth, Tom I, II, III

5. Jasiński R.: Działanie wybranych wolnoobrotowych silników hydraulicznych w warunkach szoku termicznego. Rozprawa doktorska. Politechnika Gdańska, Wydz. Mechaniczny, Gdańsk 2002.

6. Jasiński R.: Funkcjonowanie zespołów napędu hydraulicznego maszyn w niskich temperaturach otoczenia. Monografia 166, Gdańsk 2018.

7. Szenajch W.: Napęd i sterowanie pneumatyczne. WNT Warszawa 1997.

8. Niegoda J., Pomierski W.: Sterowanie pneumatyczne. Skrypt PG. Gdańsk 1998.

9. Schmid D. i inni: Mechatronika, ISBN 83-7141-425-0, Warszawa 2002.

10. Praca zbiorowa: Urządzenia i systemy mechatroniczne. Cz.1, 2. Wydawnictwo REA, 2009

Supplementary literature

1. Osiecki A: Napęd i sterowanie hydrauliczne maszyn. Teoria, obliczanie i układy. Skrypt PG, Gdańsk 1995.

2. Osiecki A.: Hydrostatyczny napęd maszyn. WNT Warszawa 1998.

3. Stryczek S.: Napęd hydrostatyczny. Tom I Elementy. Tom II Układy. WNT Warszawa 1990.

4. Heiman B., Gerth W., Popp K.: Mechatronika, metody, przykłady, tł. Gawrysiak M., Wydawnictwo Naukowe PWN, Warszawa, 2001.

5. Gawrysiak M.: Mechatronika i projektowanie mechatroniczne, Rozprawy Naukowe Nr 44, Polit. Białostocka, Białystok, 1997

	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Machinery safety directives2. Machine manufacturer's obligations3. Partly completed machinery4. Responsibility for a dangerous product5. Risk assessment with definition of the machine function6. Hazard identification7. Risk assessment documentation8. Electrical equipment - degrees of protection9. Stopping the machine for safety reasons	
Practical activites within the subject	Not applicable	

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