GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mechatronics in transport, PG_00057112		
Field of study	Transport and Logistics		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
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	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Ship Manufacturing Technology, Quality Systems and Materials Science -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Wiesław Tarełko	
	Teachers	mgr inż. Wojciech Olszewski prof. dr hab. inż. Wiesław Tarełko	

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	9.0	21.0	75

Subject objectives	**The objective of the subject is:** - to educate students with the basic knowledge regarding the modern mechatronic systems used in transport - to prepare students for design of specialized mechatronic systems used in a wide variety of transport units

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W04] The student has basic knowledge of IT and telecommunication systems in transport and in the area of control in transport systems	Student mentions essential reasons for integration of mechanical, electronic and informatics components in order to obtain the mechatronic system Student mentions basic components of the mechatronic system Student mentions fundamental types of the mechatronic systems Student presents a general characteristic, manufacture processes, and application examples of the microelectromechanical systems MEMS Student presents a general characteristic, manufacture processes, and application examples of the nanoelectromechanical systems NEMS	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
	[K7_W02] The student has an extensive knowledge of modeling transport processes, including the knowledge necessary to describe and evaluate the functioning of selected elements of the transport system	Student presents examples of sensors and actuators application in the mechatronic systems used in means of transport etc. Student enumerates physical phenomena used in sensors and actuators of the mechatronic systems Student defines a sensor/an actuator and presents their taxonomy according to the preferred criteria	[SW1] Assessment of factual knowledge
	[K7_U02] The student is able to plan and carry out research experiments in selected transport issues using various research methods	Student draws up a basic block scheme of the mechatronic system Student selects a physical phenomenon assured realizing the specified function by the mechatronic system sensor Student selects a physical phenomenon assured realizing the specified function by the mechatronic system actuator Student selects sensors assured realizing the specified function in the mechatronic system Student selects actuators assured realizing the specified function in the mechatronic system Student designs the mechatronic system realizing the specified function	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task

Subject contents	Introduction to Mechatronics Which devices can be considered as a mechatronic unit? Do always mechatronization have a sense? Mechatronic System Classification of mechatronic systems MEMS systems (general characteristics; technology; examples of applications) NEMS systems (general characteristics; technology; examples of applications) Physical phenomena used in sensors and actuators of mechatronic systems Mechatronic sensors - classification systems Mechatronic sensors used to measure mechanical, thermal and biochemical parameters Mechatronic actuators Selected systems of transport industry Mechatronic design inspired by nature
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
laboratory	51.0%	49.0%
lectures - test	66.0%	51.0%

Recommended reading

Basic literature	Robert Munnig Schmidt, Georg Schitter, Adrian Rankers and Jan van Eijk, The Design of High Performance Mechatronics 2nd revised edition. IOS Press, 2014. Bishop, Robert H., Mechatronics: an introduction. CRC Press, 2006. De Silva, Clarence W., Mechatronics: an integrated approach. CRC Press, 2005 Onwubolu, Godfrey C., Mechatronics: principles and applications. Butterworth-Heinemann, 2005.
Supplementary literature	Rankers, Adrian M., Machine Dynamics in Mechatronic Systems. University Twente, 1997
eResources addresses	Adresy na platformie eNauczanie: Mechatronika w transporcie, L, Transport i logistyka, sem. 01, IIst,letni, 2022/2023 (PG_00057112) - Moodle ID: 29920 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29920

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable