



Subject card

Subject name and code	Physics, PG_00055440						
Field of study	Mechatronics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			9.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Zakład Energetyki i Automatyki Morskiej -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Małgorzata Śmiatek-Telega					
	Teachers	dr inż. Joanna Grochowalska dr inż. Klaudia Wrzask dr inż. Joanna Grzelak					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	15.0	15.0	0.0	0.0	75
	E-learning hours included: 0.0						
Additional information: N/A							
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	75	39.0		111.0	225	
Subject objectives	N/A						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U03] has self-learning skills	The student understands the importance of non-technical aspects and effects of engineering activities, including its impact on the environment.			[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment		
	[K6_W02] has a knowledge in term of physics that includes mechanics, thermodynamics, optics, electricity, magnetism, atomic physics, nuclear physics, solid state physics, including the knowledge necessary to understand basic phenomena occurring in mechatronic elements and systems and its surroundings	The student has systematic knowledge of modern physics: vibrations, mechanical waves, RLC circuits, electromagnetic waves, optics, matter waves, elements of atomic physics and nuclear energy, basics of quantum physics			[SW1] Assessment of factual knowledge		
[K6_U01] is able to acquire information from literature, databases and other, properly chosen sources, integrate this information, interpret them, draw conclusions and formulate opinions	The student has the ability to analyze information and use methods to expand specialized knowledge in the field of production engineering.			[SU2] Assessment of ability to analyse information			

Subject contents	<p>Lecture:</p> <ol style="list-style-type: none"> Vibrations and mechanical waves RLC circuits Electromagnetic waves Optics in wave terms Optics from a corpuscular perspective Elements of condensed phase physics Elements of atomic physics Elements of physics and nuclear energy <p>Exercises:</p> <ol style="list-style-type: none"> Vibrations Mechanical waves RLC circuits electromagnetic waves Optics <p>Laboratory:</p> <ol style="list-style-type: none"> Knowledge of the principles of operation of elements in an RLC circuit Knowledge of the principles of operation and the ability to connect a system containing a simple sensor Simple assembly of an electronic system that performs a given action Learning to program Arduino and other programs necessary for data visualization 														
Prerequisites and co-requisites	Fundamentals of differential calculus and geometry. Fundamentals of classical mechanics. Basic skills in programming														
Assessment methods and criteria	<table border="1" data-bbox="448 940 1495 1081"> <thead> <tr> <th data-bbox="448 940 798 981">Subject passing criteria</th> <th data-bbox="801 940 1141 981">Passing threshold</th> <th data-bbox="1144 940 1495 981">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 981 798 1010">Laboratory</td> <td data-bbox="801 981 1141 1010">50.0%</td> <td data-bbox="1144 981 1495 1010">30.0%</td> </tr> <tr> <td data-bbox="448 1010 798 1039">Lecture</td> <td data-bbox="801 1010 1141 1039">50.0%</td> <td data-bbox="1144 1010 1495 1039">40.0%</td> </tr> <tr> <td data-bbox="448 1039 798 1081">Problems</td> <td data-bbox="801 1039 1141 1081">50.0%</td> <td data-bbox="1144 1039 1495 1081">30.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory	50.0%	30.0%	Lecture	50.0%	40.0%	Problems	50.0%	30.0%
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Laboratory	50.0%	30.0%													
Lecture	50.0%	40.0%													
Problems	50.0%	30.0%													
Recommended reading	Basic literature	David Halliday, Robert Resnick, Jearl Walker, Podstawy fizyki. T. 1-5, Wydawnictwo Naukowe PWN, 2012 J. Orear, Fizyka, tom 1 i 2, Warszawa 1998 A. Januszajtis, Fizyka dla Politechnik, tom 1-3, Warszawa 1991 J. Massalski, M. Massalska, Fizyka dla Inżynierów, tom 1 i 2, Warszawa 2013													
	Supplementary literature	https://openstax.org/details/books/university-physics-volume-1 https://openstax.org/details/books/university-physics-volume-2 https://openstax.org/details/books/university-physics-volume-3													
	eResources addresses	Adresy na platformie eNauczenie: Fizyka, W, Ć, L, Mechatronika, sem. 4, lato, 23/24 - Moodle ID: 36629 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=36629													
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> List the properties of metals, insulators and semiconductors; what are the main differences between them? Describe p-n junction Characterise e-m waves, what differs them from mechanical ones? What are the main features of laser light? How does the nuclear reactor works? 														
Work placement	Not applicable														