



Subject card

Subject name and code	Elements of modern physics, PG_00060609						
Field of study	Design and Construction of Yachts						
Date of commencement of studies	October 2026	Academic year of realisation of subject				2028/2029	
Education level	first-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	3	Language of instruction				Polish	
Semester of study	5	ECTS credits				4.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Division of Automation and Marine Energy -> Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Małgorzata Śmiałek-Telega					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	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	6.0	34.0	100		
Subject objectives	N/A						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U01] can obtain information from literature, databases and other sources, can verify and organize the obtained information, interpret them and form conclusions and justified opinions	The student can acquire information from various sources: literature, databases, among others. They can integrate the obtained information, interpret it, draw conclusions, and formulate new ones.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	[K6_U03] able to use computer-aided design methods for yachts design, construction and operation	The student possesses the ability for self-learning.			[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	[K6_W08] has knowledge of physics, including solid state physics and optics, necessary to understand the basic physical phenomena occurring in ocean engineering	The student has knowledge in physics, including: mechanics, thermodynamics, optics, electricity and magnetism, atomic physics, nuclear physics, solid-state physics, including the necessary knowledge to understand basic phenomena occurring in the environment.			[SW1] Assessment of factual knowledge		

Subject contents	<p>Course content – lecture</p> <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"> <thead> <tr> <th data-bbox="456 972 794 1003">Subject passing criteria</th> <th data-bbox="794 972 1142 1003">Passing threshold</th> <th data-bbox="1142 972 1469 1003">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 1003 794 1034">Laboratory</td> <td data-bbox="794 1003 1142 1034">50.0%</td> <td data-bbox="1142 1003 1469 1034">30.0%</td> </tr> <tr> <td data-bbox="456 1034 794 1066">Lecture</td> <td data-bbox="794 1034 1142 1066">50.0%</td> <td data-bbox="1142 1034 1469 1066">40.0%</td> </tr> <tr> <td data-bbox="456 1066 794 1097">Problems</td> <td data-bbox="794 1066 1142 1097">50.0%</td> <td data-bbox="1142 1066 1469 1097">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														
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? 														
Practical activities within the subject	Not applicable														

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