

Subject card

Subject name and code	Faculty lecture - Physics, PG_00155450						
Field of study	Mathematics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master's 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	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Patryk Kamiński				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30		5.0		15.0	50
Subject objectives	Providing students with a comprehensive understanding of mathematical models underpinning various domains of the physical world.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[MATMU2_K01] is willing to acknowledge the limitations of his or her own knowledge and is willing to pursue further education		The student demonstrates readiness to seek a deeper comprehension of the natural world and to critically evaluate pseudoscientific claims disseminated through popular media.		[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report [SK4] test/exam - oral or written [SK8] observation of student's independent or team work		
	[MATMU2_K04] is ready to understand and appreciate the importance of intellectual honesty in one's own and other people's actions; ethical conduct		The student demonstrates readiness to seek a deeper comprehension of the natural world and to critically evaluate pseudoscientific claims disseminated through popular media.		[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report [SK4] test/exam - oral or written [SK8] observation of student's independent or team work		

Subject contents	1. Physics and Its Scope. Mathematics as the language and tool of physics. Physical quantities. Observations, experiments, and measurements. The emergence and development of physical theories. 2. Fundamental Theories of Classical Physics. Kinematics and dynamics. Fluid mechanics. Thermodynamics. Optics. Statistical physics. Electricity and magnetism. Electromagnetic waves. 3. Special and General Theory of Relativity. The MichelsonMorley experiment. Lorentz transformation. The geometry of spacetime. The twin paradox. Elements of general relativity. 4. Quantum Physics. The inadequacy of classical descriptions of microscale phenomena. Old quantum theory. Schrödingers equation. The uncertainty principle. The mathematical formalism of modern quantum mechanics. Paradoxes of quantum mechanics. Various interpretations of quantum mechanics. Elements of quantum information theory.		
Prerequisites and co-requisites	Knowledge of physics equivalent to that acquired in secondary education.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Evaluation of the student's motivation and critical stance	51.0%	10.0%
	test	51.0%	90.0%
Recommended reading	Basic literature	<i>Berkeley Physics Course:</i> 1. <i>Mechanics</i> , by Charles Kittel, Walter D. Knight, and Malvin Ruderman. 2. Electricity and Magnetism, by Edward M. Purcell. 3. Waves, by Frank S. Crawford Jr . 4. Quantum Physics, by Eyvind H. Wichmann. 5. Statistical Physics, by Frederick Reif.	
	Supplementary literature	D. Halliday, R. Renick, J. Walker, <i>Fundamentals of Physics</i> (t. 1 - 5)	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Not applicable.		
Work placement	Not applicable		

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