University of Gdańsk

Subject card

Subject name and code	Faculty lecture - Physics, PG_00155423		
Field of study	Mathematics		
Date of commencement of studies	October 2024	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	2	Language of instruction	Polish
Semester of study	3	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

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of physics equivalent to that acquired in secondary education.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Evaluation of the student’s motivation and critical stance</td><td>50.0%</td><td>10.0%</td></tr>
<tr><td>test</td><td>51.0%</td><td>90.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>"Berkeley Course of Physics"

1. Kittel, Mechanics.

2. Purcell, Electricity and Magnetism.

3. Crawford, Waves.

4. Wichmann, Quantum Physics.

5. Reif, Statistical Physics.</td></tr>
<tr><td>Supplementary literature</td><td>D. Halliday, R. Renick, J. Walker, Fundamentals of Physics (t. 1 - 5)</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Not applicable.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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