University of Gdańsk

Subject card

Subject name and code	Physics of the Atomic Nuclei and Elementary Particles, PG_00182364		
Field of study	Medical Physics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's 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	6.0
Learning profile	academic	Assessment form	exam
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Angelina Łobejko	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	45.0	30.0	0.0	0.0	0.0	75

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	75	0.0	75.0	150

Subject objectives

Deepening and systematising students' knowledge of the structure and properties of atomic nuclei and elementary particles, with particular emphasis on contemporary experimental methods and a small amount of theoretical considerations. Another important element is to show the connections between nuclear and particle physics and other areas of research (astrophysics, condensed matter physics, medical and technological applications).

<table>
<tr><td>Learning outcomes</td><td>
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<tr><th>Course outcome</th><th>Subject outcome</th><th>Method of verification</th></tr>
<tr><td>[FIZMEDMU2_U01] Can apply the scientific method in solving physical and medical problems, carrying out experiments and drawing conclusions in the field of physics, medical physics and other fields, based on in-depth knowledge, appropriate selection of sources, and mathematical and computer science methods and tools.</td><td>The student is able to perform both qualitative and quantitative calculations (using appropriate mathematical models, conservation laws, and physical principles) to determine quantities characterizing atomic nuclei, nuclear decays and reactions, as well as nuclear models. The student is able to provide nuclear reaction schemes and apply suitable models to analyze the interactions of ionizing radiation and gamma quanta with matter.</td><td>[SU4] test/exam - oral or written
[SU5] implementation of a problem task</td></tr>
<tr><td>[FIZMEDMU2_W01] Knows and understands in depth selected issues in the field of physics and medicine, the complex relationships between them, and development trends in the exact and natural sciences, health sciences, and others.</td><td>The student has in-depth knowledge of the properties and structure of atomic nuclei, as well as the mechanisms of nuclear interactions and the processes of nuclear decay and reactions. The student has detailed knowledge of the interaction of ionising radiation with matter and its impact on living organisms. In addition, the student understands the relationships between nuclear physics and particle physics, as well as their significance for other fields of science, especially medicine.</td><td>[SW4] test/exam - oral or written
[SW5] implementation of a problem task</td></tr>
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<tr><td>Subject contents</td><td>not applicable</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>A. Formal requirements: Fundamentals of classical physics. Fundamentals of quantum physics.

B. Prerequisites: Knowledge of issues related to the structure of the atom. Knowledge of the basics of mechanics and the fundamentals of differential and integral calculus.</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>not applicable</td><td>51.0%</td><td>60.0%</td></tr>
<tr><td>not applicable</td><td>51.0%</td><td>40.0%</td></tr>
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<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>not applicable</td></tr>
<tr><td>Supplementary literature</td><td>not applicable</td></tr>
<tr><td>eResources addresses</td><td></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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