

Subject card

Subject name and code	Nuclear Physics, PG_00182165						
Field of study	Medical Physics						
Date of commencement of studies	October 2025		Academic year of realisation of subject			2027/2028	
Education level	Bachelor'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	3		Language of instruction			Polish	
Semester of study	5		ECTS credits			7.0	
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	30.0	15.0	45.0	0.0	0.0	90
	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	90		0.0		90.0	180
Subject objectives	not applicable						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZMEDL3_U02] He can perform measurements of physical quantities, prepare, describe, and present the results of physical experiments, including the estimation of measurement uncertainties, and perform quantitative analyses and formulate qualitative conclusions based on them.	The student is able to perform measurements of physical quantities related to ionising radiation and nuclear processes, such as determining the activity of radioactive sources, determining the half-life, or testing the characteristics of radiation detectors. They are able to develop and present the results of simple nuclear experiments, taking into account the analysis of measurement uncertainties and performing a quantitative analysis of the results. On this basis, they are able to formulate qualitative and quantitative conclusions about the studied nuclear processes, also referring them to selected applications in medical physics.	[SU2] presentation/project/paper/report [SU3] text preparation/written work [SU4] test/exam - oral or written
	[FIZMEDL3_U09] Can communicate effectively with colleagues and other employees, works in a team, including interdisciplinary teams, and manages his/her own and his/her colleagues' time appropriately.	The student is able to communicate effectively with colleagues in a laboratory team, including an interdisciplinary team, e.g. with medical physicists, technicians or students from other specialisations. They are able to plan and organise their own work and that of their colleagues during nuclear experiments, divide tasks and deadlines, and present results and conclusions in a manner that is understandable and consistent for team members.	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[FIZMEDL3_U05] Can program and use specialised software for calculations and data analysis, including in the field of imaging diagnostics, radiotherapy and biomedical signal analysis.	The student is able to use advanced programming tools and specialised software for calculations and analysis of experimental data in nuclear physics, such as radiation spectrum analysis, activity determination and half-life calculation. They know how to use software that supports data processing and visualisation and are able to relate the results obtained to simple applications in diagnostic imaging and radiotherapy, understanding their significance in the context of medical physics.	[SU2] presentation/project/paper/report [SU3] text preparation/written work [SU4] test/exam - oral or written
	[FIZMEDL3_W09] Knows at an advanced level the construction and operating principles of measurement instruments, electronic systems, and diagnostic and therapeutic equipment used in physics research and in medical diagnosis and therapy.	The student knows the advances types of measuring instruments used in nuclear physics research, understands the principle of operation of simple ionising radiation detection systems and their role in measuring nuclear quantities. The student has knowledge of the basics of the construction of diagnostic and therapeutic equipment using ionising radiation, understanding its significance and limitations in medical applications.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report

	Course outcome	Subject outcome	Method of verification
	[FIZMEDL3_W01] Knows and understands at an advanced level the phenomena, principles, laws and theories specific to physics and biophysics.	The student has an advanced knowledge and understanding of the phenomena, laws and models of nuclear physics, such as the structure and properties of atomic nuclei, mechanisms of radioactive decay and nuclear reactions. They understand the interactions of ionising radiation with matter and their significance for biophysics and medical physics. They know the basic applications of nuclear physics in diagnostics (e.g. nuclear medicine, isotopic imaging), therapy (e.g. radiotherapy, brachytherapy), as well as other branches of medical physics and biophysics, understanding their physical basis and limitations.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report [SW3] text preparation/written work
	[FIZMEDL3_W04] Knows and understands the role of a physical experiment and the elements of the theory of measurement uncertainty.	The student knows and understands the role of experimentation in the development of nuclear physics and its importance for verifying theories and models describing nuclear phenomena. The student knows the basic elements of measurement uncertainty theory and understands their importance in interpreting the results of nuclear experiments. They also understand the need to take measurement uncertainty into account when assessing the reliability of research results used in medical physics.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report [SW3] text preparation/written work
	[FIZMEDL3_U01] He can formulate, analyse, and solve complex problems in physics and medicine, using mathematical formalism, based on the physical phenomena, principles, and theories he has learned.	The student is able to use the laws and models of nuclear physics to formulate and analyse problems related to the structure of atomic nuclei, radioactive decay processes and nuclear reactions. They are able to apply basic mathematical formalism to solve computational tasks and interpret nuclear phenomena relevant to medical applications.	[SU2] presentation/project/paper/report [SU3] text preparation/written work [SU4] test/exam - oral or written
Subject contents	not applicable		
Prerequisites and co-requisites	not applicable		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	not applicable	51.0%	20.0%
	not applicable	51.0%	25.0%
	not applicable	51.0%	55.0%
Recommended reading	Basic literature	not applicable	
	Supplementary literature	not applicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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