

Subject card

Subject name and code	Methods of Detecting Ionizing Radiation, PG_00179272						
Field of study	Medical Physics						
Date of commencement of studies	October 2023		Academic year of realisation of subject			2025/2026	
Education level	Bachelor's studies		Subject group			Obligatory subject group in the field of study Optional subject group	
Mode of study	full-time studies		Mode of delivery			at the university	
Year of study	3		Language of instruction			Polish none	
Semester of study	6		ECTS credits			3.0	
Learning profile	academic		Assessment form			credit	
Conducting unit							
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	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		0.0		0.0	30
Subject objectives	The aim of the course is to familiarize students with the physical principles, construction, and applications of detectors used to record and measure ionizing radiation in physics, nuclear technology, and medicine.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	FIZMEDL3_W32		The student knows and understands the principle of operation, characteristics, and scope of application of various methods and detectors used to record ionizing radiation. They can explain the physical mechanisms of radiation detection, compare the properties of different types of detectors (gas, scintillation, semiconductor), and indicate their application in medicine.			[SW4] test/exam - oral or written	
	[FIZMEDL3_K01] knows the limitations of his own knowledge and understands the need for further education		The student is aware of the limitations of their knowledge in the field of ionizing radiation detection methods and understands the need to systematically expand it, especially in the context of the dynamic development of detection technologies used in medical diagnostics and therapy. They recognize the importance of continuous professional development and keeping up with scientific progress in the field of medical physics.			[SK4] test/exam - oral or written	

Subject contents	Classification of types of ionizing radiation. Mechanisms of interaction between ionizing radiation and matter. The idea of radiation measurement conversion of radiation energy into an electrical signal. General parameters of detectors. Gas detectors. Scintillation detectors. Semiconductor detectors. Electronics and signal analysis. Dosimetry and personal detectors. Medical applications of radiation detection methods.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		51.0%	100.0%
Recommended reading	Basic literature	1. A. Strzałkowski <i>Wstęp do fizyki jądra atomowego</i> , PWN 1978. 2. C. Grupen, B. Shwartz <i>Particle Detectors</i> , Cambrige Univeristy Press, 2008. 3. E. Skrzypczak, Z. Szepliński <i>Wstęp do fizyki jądra atomowego i cząstek elementarnych</i> , PWN 1995. 4. J. Araminowicz, K. Małuszyńska, M. Przytuła <i>Laboratorium fizyki jądrowej</i> , PWN 1974. 5. Glenn F. Knoll <i>Radiation, detection and Measurement</i> , John Wiley & Sons 1999.	
	Supplementary literature	1. W. R. Leo <i>Techniques for Nuclear and Particle Physics Experiments</i> , Springer 1994 2. G. Mauri <i>Development and characterization of detectors for large area application in neutron scattering and small area application in neutron reflectometry</i> , DOI: 10.48550/arXiv.1905.12311 , 2019.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Discuss the gas counters most commonly used in dosimetry. Explain the interaction of heavy charged particles with matter and, based on this, explain the difference between traditional therapy and proton therapy. Discuss X-rays and their use in medicine.		
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.