

Subject card

Subject name and code	Methods of Detecting Ionizing Radiation, PG_00179272						
Field of study	Medical Physics						
Date of commencement of studies	October 2024		Academic year of realisation of subject			2026/2027	
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	
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 advanced methods of ionizing radiation detection, including the physical principles underlying the operation of detectors, the mechanisms by which radiation interacts with matter, and the principles of recording and analyzing measurement signals used in scientific research, engineering, and medical physics.			[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work	
	[FIZMEDL3_K01] knows the limitations of his own knowledge and understands the need for further education		The student recognizes the limitations of his or her own knowledge and skills regarding methods of ionizing radiation detection, is able to identify areas requiring further development, and understands the need to continuously update his or her knowledge regarding advances in detection techniques, measuring instruments, and their applications in medical physics.			[SK1] oral statement/conversation/ discussion [SK3] text preparation/written work	

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
	written and oral test	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			
Work placement	Not applicable		

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