



## Subject card

Subject name and code	Radiation detectors, PG_00053366						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Optional subject group Specialty subject group 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	2		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Grażyna Jarosz				
	Teachers		dr hab. inż. Grażyna Jarosz				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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		2.0		18.0	50
Subject objectives	Students acquire knowledge of the physical foundations of electromagnetic radiation detection, the construction and operation of electromagnetic radiation detectors and their use in biomedical engineering.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U12] is able, to an increased extent, to analyze the operation of components and systems related to the field of study, as well as to measure their parameters and study their technical characteristics, and to plan and carry out experiments related to the field of study, including computer simulations, interpret the obtained results and draw conclusions		Student can experimentally determine the basic parameters of thermal and photon detectors		[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	[K7_W03] knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum		A student knows the physical basis of e-radiation detection, knows the detectors used in the microwave, IR, VIS, UV and X ranges		[SW1] Assessment of factual knowledge		
	[K7_W02] knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study		Student can discuss any issue related to the subject matter		[SW1] Assessment of factual knowledge		

Subject contents	1. Electromagnetic radiation, sources and interaction with matter. 2. Thermal radiation.3. Radiationdetectors, classification. 4. Detector noise. 5. Detector parameters.6. Ionizing radiation detectors. 7. Thermal detectors: bolometers, thermocouples, pyrometers. 8. Scintillation detectors. 9. Semiconductor photondetectors. 10. CCD matrix.11. X-ray and gamma-ray detectors used in medicine.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		100.0%	30.0%
		50.0%	70.0%
Recommended reading	Basic literature	1. J. Godlewski "Generacja i detekcja promieniowania optycznego"PWN Warszawa 2002.2. G. Jarosz "Detektory promieniowania", e-skrypt dla "inżynieriibiomedycznej"	
	Supplementary literature	Z. Bielecki, A. Rogalski, "Detektory promieniowania optycznego", WNTWarszawa 2001.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Classification of e-m detectors		
Work placement	Not applicable		

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