



Subject card

Subject name and code	Radiation detectors, PG_00053366						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2024	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	2	Language of instruction			Polish		
Semester of study	3	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						
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	To acquaint students with the construction and principles of operation of e-m radiation detectors						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[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	Student can discuss any issue related to the subject matter			[SW1] Assessment of factual knowledge		
	[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 measure basic parameters of thermal and photon detectors			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		
	[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 knows the physical basics of radiation detection			[SW1] Assessment of factual knowledge		

Subject contents	1. Electromagnetic radiation, sources and interaction with matter. 2. Thermal radiation. 3. Radiation detectors, classification. 4. Detector noise. 5. Detector parameters. 6. Detectors of ionizing radiation. 7. Photographic plates. 8. Thermal detectors: bolometers, thermocouples, pyrometers. 9. Thermo-emission and scintillation detectors. 10. Semiconductor photon detectors. 11. CCD matrices. 12. X-ray and gamma-ray detectors used in medicine. laboratory 1. Investigation of the p-n photodiode 2. Investigation of the radiation thermostat. 3. Examination of the scintillation detector.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		51.0%	70.0%
		100.0%	30.0%
Recommended reading	Basic literature	G.H. Rieke, Detection of Light, Cambridge University Press	
	Supplementary literature	G.H. Rieke, Detection of Light, Cambridge University Press	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Give the types of noises in the detectors		
Work placement	Not applicable		

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