GDAŃSK UNIVERSITY OF TECHNOLOGY

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 2027	Academic year of realisation of subject	2027/2028
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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grażyna Jarosz	
	Teachers	dr hab. inż. Grażyna Jarosz	

Lesson types

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_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
[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

Subject contents

Course content – lecture

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. Thermaldetectors: 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	

Example issues/ example questions/ tasks being completed

Classification of e-m detectors

Practical activites within the subject

Not applicable