

Subject card

Subject name and code	Devices Used in Nuclear Medicine and Molecular Imaging, PG_00210347						
Field of study	Medical Physics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Optional 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	4		ECTS credits		3.0		
Learning profile	academic		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Anna Synak				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	0.0	0.0	0.0	0.0	45
	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	45		0.0		30.0	75
Subject objectives	To provide students with knowledge of the operation and handling of equipment used in radioisotope diagnostics during the implementation of medical procedures.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZMEDMU2_W01] Knows and understands in depth selected issues in the field of physics and medicine, the complex relationships between them, and development trends in the exact and natural sciences, health sciences, and others.	The student understands the applications of imaging equipment and techniques used in nuclear medicine diagnostics, including their role in medical procedures, quality control, and ensuring safe clinical practice.	[SW2] presentation/project/paper/report
	[FIZMEDMU2_K03] He is ready to take a scientific approach to the issues being solved, using scientific literature, as well as expert opinions, in case of difficulties in solving the problem on his own.	The student is prepared to critically evaluate information related to equipment and procedures used in nuclear medicine diagnostics and to apply current scientific evidence and professional guidelines to support quality assurance and the safe performance of diagnostic procedures.	[SK2] presentation/project/paper/report
	[FIZMEDMU2_U06] Can effectively communicate on specialised topics in the field of physics and medical physics with diverse audiences (specialists and non-specialists), skillfully justifying his/her position.	The student is able to explain the design, operating principles, and clinical applications of equipment used in nuclear medicine diagnostics, using appropriate scientific terminology and adapting the communication to both specialist and non-specialist audiences.	[SU2] presentation/project/paper/report
	[FIZMEDMU2_W04] Knows and understands in depth the theoretical foundations and principles of operation of measurement systems and research, diagnostic and therapeutic equipment specific to the field of physics and medicine.	The student understands the theoretical foundations and operating principles of the diagnostic equipment used in nuclear medicine, including gamma cameras, SPECT, PET, PET/CT, SPECT/CT, and PET/MR systems, as well as tomographic image reconstruction methods and systems for the transmission and archiving of medical imaging data.	[SW2] presentation/project/paper/report
Subject contents	1. Gamma Camera and SPECT Gamma Camera: Structure and Operation 2. PET Scanner: Structure and Operation 3. Hybrid Diagnostic Imaging Systems: SPECT/CT, PET/CT, and PET/MR 4. Equipment Supporting Work in a Nuclear Medicine Department 5. Tomographic Image Reconstruction Methods 6. Computer Networks, Communication, Image Transfer, DICOM, and Archiving 7. Examples of the Most Important Diagnostic Examinations in Planar Scintigraphy, SPECT Tomography, and PET/CT 8. Fundamentals of Quality Control 9. Safety Principles in a Nuclear Medicine Department and During Equipment Operation		
Prerequisites and co-requisites	Knowledge of the physical phenomena describing the interactions of ionizing and non-ionizing radiation with matter and biological tissues, with particular emphasis on the energy ranges and types of radiation used in medicine. Basic knowledge of the structure and operating principles of medical equipment, including X-ray imaging systems.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	presentation	51.0%	100.0%
Recommended reading	Basic literature	Prof. Dr hab. Piotr Lass „Medycyna nuklearna w codziennej praktyce lekarskiej” https://www.siemens-healthineers.com/en-us/molecular-imaging/mi-news/imaging-life-publications.	
	Supplementary literature	none	
	eResources addresses		

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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