



Subject card

Subject name and code	Medical Imaging, PG_00050111						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2024/2025		
Education level	first-cycle 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	4	Language of instruction			Polish		
Semester of study	7	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Artur Poliński				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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		3.0		42.0	75
Subject objectives	Information about selected issues of medical imaging						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study		has basic knowledge of various tomographies		[SW1] Assessment of factual knowledge		
	[K6_W53] Knows and understands, to an advanced extent, selected aspects of materials science and biomaterials constituting general knowledge related to the field of study		has basic knowledge of various tomographies		[SW1] Assessment of factual knowledge		
	[K6_U53] can apply equipment used in biomedical diagnostics		has basic knowledge of various tomographies		[SU1] Assessment of task fulfilment		
Subject contents	1. Introduction to CT imaging 2. Algebraic reconstruction 3. Iterative reconstruction 4. Radon transform 5. Sinogram 6. Inverse Radon transform 7. Filtering and reconstruction by filtered backprojection 8. Introduction to MRI imaging 9. 2D and 3D Fourier imaging in MRI 10. Projection reconstruction in MRI 11. Multislice MRI imaging 12. T1 and T2 weighted images 13. Fast MRI imaging 14. High resolution and microscope MRI imaging 15. MRI flow imaging 16. Introduction to SPECT and PET tomography 17. Maximum likelihood algorithm 18. Attenuation and scattering correction methods						
Prerequisites and co-requisites	No requirements						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	project		51.0%		50.0%		
	exam		51.0%		50.0%		

Recommended reading	Basic literature	Björck ., Dahlquist G., Metody numeryczne, PWN 1983 Chmielewski L., Kulikowski J.L., Nowakowski A. (red.) Obrazowanie biomedyczne. Biocybernetyka i Inżynieria Biomedyczna 2000, Tom 8, Akademicka Oficyna Wydawnicza Exit 2003 Cho Z.-H., Jones J. P., Singh M., Foundations of Medical Imaging, John Wiley & Sons 1993 Cierniak R., Tomografia komputerowa. Budowa urządzeń CT. Algorytmy rekonstrukcyjne, Akademicka Oficyna Wydawnicza Exit 2005 Cornelis J., An introduction to medical magnetic resonance imaging, VUB, Brussel 1998 Fortuna Z., Macukow B., Wąsowski J., Metody numeryczne, WNT 2006 Lippman S. B., Lajoie, Podstawy języka C++, WNT, 2001 Ralston A., Wstęp do analizy numerycznej, PWN 1983 Stoer J., Bulirsch R., Wstęp do analizy numerycznej, PWN 1987 Tondo C. L., Leung B.P., Podstawy języka C++. Ćwiczenia i rozwiązania, WNT, 2001 Vievergever M. A., Todd-Pokropek A., Mathematics and computer science in medical imaging, Springer-Verlag 1988
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	