



Subject card

Subject name and code	, PG_00065672						
Field of study	Mechanical and Medical Engineering						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group				
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		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Technologii Biomateriałów -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marcin Wekwejt				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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		10.0		60.0	100
Subject objectives	The objective of the course is to impart knowledge and skills in advanced technologies, measurement methods, and diagnostic techniques used in medical engineering. Students will become familiar with modern diagnostic techniques, imaging methods, and devices applied in medical diagnostics. Additionally, they will understand the mechanisms of operation and possibilities for optimizing measurement procedures for practical applications in experiments related to biomaterials engineering.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W09] He/she in-depth knowledge related to diagnosis techniques and medical procedures in the scope of the field of study of mechanical-medical engineering		The student understands diagnostic techniques and can interpret measurement results in the context of medical applications.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K7_W04] He/she has in-depth knowledge related to the construction and utilization of machines used mechanical-medical engineering		The student is able to apply knowledge of the structure and operating principles of diagnostic devices in engineering practice.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
Subject contents	The course focuses on the practical understanding of advanced measurement and diagnostic technologies used in biomaterials engineering. Student will gain knowledge and practical skills in the following areas: (1) Introduction to advanced measurement technologies used in biomaterials analysis, (2) Diagnostic techniques applied in medical engineering to evaluate biomaterial properties, (3) Modern imaging methods and their potential applications in biomaterials engineering, (4) Functional and biomechanical diagnostics of synthetic tissue substitutes, (5) Application of measurement technologies in surgery and orthopedics, as well as assessment of the medical potential of materials, (6) Optimization of diagnostic and measurement procedures in medical engineering.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Portfolio containing reports from conducted experiments		75.0%		100.0%		
Recommended reading	Basic literature		1. Bronzino, J. D., & Peterson, D. R. The Biomedical Engineering Handbook. CRC Press, 2020. 2. Riederer, S. J., & Moratal, D. Principles of Biomedical Imaging. Cambridge University Press, 2018./ 3. Ratner, B. D., Hoffman, A. S., Schoen, F. J., & Lemons, J. E. Biomaterials Science: An Introduction to Materials in Medicine. Academic Press, 2020.				

	Supplementary literature	1. Prince, J. L., & Links, J. M. Medical Imaging Signals and Systems. Pearson, 2014. 2. Bruce, E. N. Biomedical Signal Processing and Signal Modeling. Wiley-Interscience, 2001. 3. Basu, B., Katti, D. S., & Kumar, A. Advanced Biomaterials: Fundamentals, Processing, and Applications. John Wiley & Sons, 2009.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> - What are the key diagnostic technologies used in medical engineering? - Create a report on diagnostic studies using computational tools. - What are the latest imaging methods in medical diagnostics? - Conduct an experimental project for the measurement analysis of selected biomaterial properties and evaluate the results. - Perform statistical analysis of diagnostic study results and interpret the findings. - Which techniques should be applied to assess the reliability and accuracy of diagnostic results? - Prepare a brief presentation of diagnostic study results and conduct a scientific discussion on the findings. 	
Work placement	Not applicable	

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