



## Subject card

Subject name and code	, PG_00065673						
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	15.0	30.0	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		10.0		45.0	100
Subject objectives	The objective of the course is to develop skills in designing and planning scientific experiments in mechanical-medical engineering. Students will gain knowledge about experimental strategies, statistical data analysis, and hypothesis testing. The course will focus on methods for evaluating the properties of selected materials (or biomaterials), enabling students to independently plan and conduct scientific research as well as assess the results obtained.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W01] He/she has broad knowledge referring to the high level math to solve numerical problems and tasks related to planning and to work out results of research in the scope of the field of study of mechanical-medical engineering		The student possesses knowledge that enables them to solve computational problems as well as plan and process scientific research results.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K7_U04] He/she can use programming-communicative techniques concerning to the scope of engineering tasks		The student is able to apply knowledge of experiment planning to design and conduct scientific research in the field of mechanical-medical engineering.		[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
Subject contents	The course emphasizes the practical aspects of designing and conducting experiments in mechanical-medical engineering. Student will acquire knowledge and practical skills in the following areas: (1) Introduction to practical experiment design, (2) Principles and strategies for planning experiments in mechanical-medical engineering, (3) Conducting experiments in the laboratory and evaluating results, (4) Critical analysis and verification of research hypotheses, (5) Techniques for processing and analyzing data from experimental studies, (6) Presentation of research results and formulation of conclusions.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Case Study of Specific Research Project(s)		75.0%		100.0%		

Recommended reading	Basic literature	1. Antony, J. Design of Experiments for Engineers and Scientists. Elsevier, 2014. 2. Box, G. E. P., Hunter, J. S., & Hunter, W. G. Statistics for Experimenters: Design, Innovation, and Discovery. John Wiley & Sons, 2005. 3. Montgomery, D. C. Design and Analysis of Experiments. John Wiley & Sons, 2017.
	Supplementary literature	1. Ryan, T. P. Modern Experimental Design. John Wiley & Sons, 2007. 2. Wu, C. F. J., & Hamada, M. S. Experiments: Planning, Analysis, and Parameter Design Optimization. John Wiley & Sons, 2009. 3. Box, G. E. P., & Draper, N. R. Empirical Model-Building and Response Surfaces. John Wiley & Sons, 1987.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>- What are the key principles of experiment design in mechanical-medical engineering?</li> <li>- Develop an experiment plan regarding the assessment of selected biomaterial properties.</li> <li>- What are the main stages of executing an experimental project?</li> <li>- Conduct a research project in the laboratory and analyze the results.</li> <li>- Perform statistical analysis of the research results and interpret the findings.</li> <li>- What techniques should be used to verify research hypotheses?</li> <li>- Prepare a presentation of the research results and discuss them.</li> </ul>	
Work placement	Not applicable	

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