GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00073361						
Field of study	Mechanical and Medical Engineering						
Date of commencement of studies	February 2026		Academic year of realisation of subject	2026/2027			
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	3.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Division of Biomaterials Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Michał Bartmański					
	Teachers						

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	0.0	0.0	45

E-learning hours included: 0.0

eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=9097

Moodle ID: 9097 Budowa i eksploatacja urządzeń pomiarowych https://enauczanie.pg.edu.pl/2025/course/view.php?id=9097

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	5.0	25.0	75

Subject objectives

The aim of the course is to familiarize the student with the construction, operating principles, and operation of advanced measuring devices and systems used in medical engineering. The student learns the principles of selecting measuring equipment, conducting measurements correctly, and assessing the proper operation of measuring devices.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W03] has structured and well-founded knowledge covering issues in the field of medical engineering allowing to design medical devices, rehabilitation systems and to formulate research procedures	Explains the construction, operation, and use of measuring devices applied in medical engineering.	[SW3] Assessment of knowledge contained in written work and projects
[K7_W01] describes constructions of medical devices and their functioning on the base of knowledge related to the medical engineering	Describes the construction and operating principles of selected measuring devices and systems used in medical diagnostics and research.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents

Course content – lecture

Construction and operating principles of advanced measuring devices and systems used in engineering research. Selection of equipment configuration and measurement parameters according to the investigated object. Calibration, metrological verification, identification of error sources, and evaluation of measurement uncertainty. Diagnostics, reliability, maintenance, and safe operation of measuring equipment. Limitations of measurement methods and critical assessment of the quality and reliability of acquired data.

Course content – laboratory

Configuration and advanced operation of selected measuring devices. Selection of operating parameters, calibration, and verification of proper measurement-system performance. Processing and critical evaluation of results obtained using different measurement configurations.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Report	56.0%	100.0%

Recommended reading	Basic literature	Operating instructions, user manuals, and technical documentation provided by manufacturers of basic measuring equipment, particularly scanning electron microscopes (SEM), energy-dispersive X-ray spectroscopy (EDS) systems, atomic force microscopes (AFM), FTIR spectrometers, and other instruments used in materials and biomedical research. Selected standards concerning measuring equipment, calibration, metrological verification, and the safe use of laboratory and medical devices.
	Supplementary literature	-
	eResources addresses	
Example issues/ example questions/ tasks being completed	• Construction and operating principles of measuring devices and systems. • Metrological parameters and measurement errors. • Calibration, verification, and diagnostics of measuring devices. • Principles of proper and safe operation of measuring equipment.	
Practical activites within the subject	Not applicable	

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