GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Measuring and measurement systems, PG_00071279		
Field of study	Technologies for Industry 5.0		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
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	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Division of Magnetic Properties of Materials -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Chmielewski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	45.0	0.0	0.0	75

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	75	5.0	70.0	150

Subject objectives

The purpose of the course is, first of all, to familiarize the student with the operation of basic power and control-measurement tools, based on modern digital technology, used in electronic laboratory practice as well as in non-laboratory conditions, to familiarize students with the technique of digital data processing and the determination of measurement uncertainty. The next objective will be the task of using control and measurement tools in the field of independent electronic prototyping. The student will get acquainted with the meaning and importance of constructing conditioning modules, understand the basic laws that apply in electronic metrology.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U05] interprets phenomena occurring around the technological process and processes occurring in the life cycle of devices and systems, makes a critical assessment of the functioning of existing solutions	The student will learn digital data processing techniques, gain the ability to critically analyze the obtained measurement results, be able to analyze the correctness of complex measurement processes, gain the ability to optimize in the field of metrology of measurement systems.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
[K6_W05] demonstrates practical knowledge related to technological processes, utilized devices and systems, has knowledge regarding selected processes monitoring tools	The student will learn the capabilities of digital metrology used in modern measurement techniques. He or she will gain a working knowledge of the preparation of the elements and procedures necessary to carry out the measurement process, and will understand the importance of physical limitations in metrological processes.	[SW3] Assessment of knowledge contained in written work and projects

<table>
<tr><td>Subject contents</td><td>Course content – lecture
The content of the course is, first, to acquire the student's ability to operate and use the following laboratory equipment: multi-section laboratory power supplies, digital universal multimeters, multi-channel digital oscilloscopes, function and arbitrary generators. In the second place, the student will obtain practical knowledge of the construction of electronic, simple prototype circuits using contact board-based techniques and PCB prototype boards, practice the process of planning an experiment, selecting the right measurement equipment, producing appropriate, content-compatible studies from the realized measurement experiment.
Course content – laboratory
During the laboratories, basic activities in the field of practical metrology will be carried out using various types of universal meters, simple digital oscilloscopes, arbitrary generators, and laboratory power supplies. For the purposes of measuring frequency characteristics, students will construct elementary electronic circuits on prototype boards. During the exercises, voltage divider circuits, integrating circuits, and differentiating circuits will be tested. Software control of measurement processes will also be covered.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Not Required</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Lab</td><td>80.0%</td><td>70.0%</td></tr>
<tr><td>lecture</td><td>50.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Podstawy elektrotechniki i elektroniki, Marian Doległo; Wydawnictwa Komunikacji i Łączności WKŁ

Podstawy pomiarów; Grzegorz Tarapata, Jacek Dusza, Paweł Gąsio; Oficyna Wydawnicza Politechniki Warszawskiej

Pomiary elektryczne i elektroniczne; Daniel Wilczkowski Michał Cedro; Wydawnictwa Komunikacji i Łączności</td></tr>
<tr><td>Supplementary literature</td><td>Not Required</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Analog-to-digital processing

Digital universal meters

Frequency analysis and electrical interference.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.