GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Non-electrical quantities measurement and sensors, PG_00062737		
Field of study	Technologies for Industry 5.0		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department Of Functional Materials Engineering -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Piotr Jasiński	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	30.0	0.0	0.0	60

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	60	5.0	85.0	150

Subject objectives

The aim of the course is to present the different types of sensors and their mechanisms of operation

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] has the ability to plan, prepare and carry out engineering activities using practical knowledge and understanding of the specificity of materials, devices and tools, processes and technologies, and prepare a substantive report	Students will be able to select the appropriate transducer of physical quantities to meet the objective	[SU1] Assessment of task fulfilment
[K6_K03] effectively, clearly and unambiguously conveys information, describes activities and communicates their results and opinions of a specialist engineer using appropriate communication methods and tools	The student is able to communicate technical and scientific information effectively, using precise language and terminology appropriate to the audience and the context.	[SK1] Assessment of group work skills
[K6_W03] demonstrates knowledge on materials used in industrial technologies, their structure and fabrication, knows the principles of conducting research, analyzing it and creating technical documentation	Students will be familiar with the construction and principle of operation of sensors and transducers	[SW1] Assessment of factual knowledge

Subject contents

Basic concepts measurand, measurement object, measurement transducer, measurement paths, measurement errors. Measurement transducers classification, metrological properties of sensors and their determination. Dynamic properties of transmitters. Resistance sensors in measuring systems. Temperature measurements. Basics of optical pyrometry. Humidity measurements. Stress measurements - strain gauges. Pressure measurements. Inductive sensors and their applications. Capacitive sensors and their applications. Impedance sensor measurement systems. Force and pressure measurements. Flow measurements. Pulse and code transducers. Optoelectronic transducers. Position and motion measurements. Seismic measurements. Vibration and vibration measurements.

Prerequisites and co-requisites

<table>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Lecture -quiz</td><td>50.0%</td><td>70.0%</td></tr>
<tr><td>Lab</td><td>50.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">DE SILVA, Clarence W. Sensors and actuators: Engineering system instrumentation. CRC press, 2015.

NORTHROP, Robert B. Introduction to instrumentation and measurements. CRC press, 2018.

KALANTAR-ZADEH, Kourosh. Sensors: an introductory course. Springer Science & Business Media, 2013</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">GHOSH, Arun K. Introduction to measurements and instrumentation. PHI Learning Pvt. Ltd., 2012.</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">List the types of temperature sensors and describe the principle of operation of selected ones</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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