GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Automatics and Measurement of Physical Quantity, PG_00048555		
Field of study	Chemical Technology		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2022/2023
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	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Gębicki	
	Teachers	dr hab. inż. Jacek Gębicki dr inż. Bartosz Szulczyński	

Lesson types and methods of instruction

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

Additional information:
classes are conducted at the University in a traditional form

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	2.0	53.0	100

Subject objectives

The student should identify the elements of the regulation system, understand the principles of their operation and interaction, and know the methods for measuring physicochemical quantities.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W10	The student has basic knowledge of electrical engineering, automation and computer science	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
K6_U10	The student knows the principles of automatic regulation	[SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information
K6_W04	The student is able to analyze the occurring technological processes and correctly conclude	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
K6_U04	The student acquires basic knowledge in the field of designing selected unit processes	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools

Subject contents	Basic concepts and quantities. Feedback, regulation and control systems. Block diagrams. Basics of mathematical description of dynamic properties of control system components. Steady and transient states of processes. Setting up control and regulation of processes - regulators and actuators. Methods of testing and analysis of transient processes. Selection of regulators. Stability and quality of control. Criteria for assessing the quality of regulation. Types of regulation. Measurements of basic process parameters. Temperature measurement and regulation, thermometric sensors, construction, principle of operation. Dynamics of thermometric sensors. Pressure measurement, construction and principle of manometers. Measurement of the volume flow rate of liquids, liquid level, density, viscosity, humidity.
Prerequisites and co-requisites	Movement of electric charges, hydrostatics, heat movement, physical quantities, units, basic concepts of differential calculus

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
lecture	60.0%	70.0%
laboratory	60.0%	30.0%

Recommended reading

Basic literature	1. W. Greblicki: Podstawy automatyki, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006, 2. Automatyka i robotyka podstawy, Wydawnictwo PG, Gdańsk 2003, 3. D. Taler, J. Sokołowski: Pomiary cieplne w przemyśle, Agenda Wydawnicza PAK, Warszawa 2006, 4. M.W. Kułakow: Pomiary technologiczne i aparatura kontrolno pomiarowa w przemyśle chemicznym, WNT, Warszawa 1972, 5. E. Romer: Miernictwo przemysłowe, WNT, Warszawa.
Supplementary literature	Not applicable
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	For a tank with a volume of 2 m3 and a height of 0.8 m, the Z1 valve is connected to process water at a rate of 0.5 l / s, the Z2 valve is drained at a rate of 0.2 l / s. The level sensor switches off the Z1 valve when the liquid level in the tank reaches 0.6 m ± 0.05. Assume that the transmittance of an object is described by the dependence: $G_o(s) = (3/12s + 1) * \exp(-3s)$ designate: 1. difficulty level of regulation (if applicable), 2. choosing the right regulator, 3. system stability
Work placement	Not applicable