



Subject card

Subject name and code	Essentials of Automatics and Control, PG_00039956						
Field of study	Management and Production Engineering, Management and Production Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
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			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Rafał Hein					
	Teachers	dr hab. inż. Rafał Hein					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0 Adresy na platformie eNauczenie:						
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	15	2.0		8.0		25
Subject objectives	Presentation of fundamental issues related to automatic control systems. Knowing the structure and components of a typical automation system. Obtaining general knowledge about analog and digital control systems. Acquisition of practical skills to design and synthesis of logic control systems - combinational and sequential. Use of block diagram schemes to graphically presentation of control systems. Description of control systems by using transfer function. Knowledge of methods of design, analysis and study of the properties of continuous control systems.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_K01	The student is aware of the need for self-improvement resulting from the dynamic development of modern methods and systems for controlling production processes.			[SK5] Assessment of ability to solve problems that arise in practice		
	K6_U07	Student can realistically assess the purposefulness and possible need for the use of appropriate control systems in production processes.			[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_W04	Student knows the construction, structure and the general principle of operation of basic automation systems. He can design simple digital control systems as well as develop general concepts of analog control systems.			[SW1] Assessment of factual knowledge		
Subject contents	Definition of basic terms. General structure of control system. Analog and digital control systems. Basic information about digital control systems. Boolean algebra. Combinational logic system. Sequential logic system. Design, synthesis and analysis of digital control systems. Basic information about analog control systems. Classification of elements and control systems. A typical connections of components. Block diagrams and their transformations. Feedback. Description and classification of signals. Standard signals. Method of describing control systems, elements and signals. Application of the Laplace transformation. Concept of transfer function. Time responses. Controllers. PID controller. Tuning of PID controller. Design, synthesis and analysis of analog control systems.						
Prerequisites and co-requisites	Mathematics, Physics						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		Lecture	56.0%
Recommended reading	Basic literature	1. Holejko D., Kościelny W.J.: Automatyka procesów ciągłych, Oficyna Wydawnicza Politechniki Warszawskiej, 2012; 2. Żelazny M.: Podstawy automatyki, Państwowe Wydawnictwo Naukowe, 1976; 3. Perycz S.: Podstawy automatyki. Skrypt PG, Gdańsk 1983; 4. Węgrzyn S.: Podstawy automatyki. PWN Warszawa, 1978;	
	Supplementary literature	1. Mazurek J., Vogt H., Żydanowicz W.: Podstawy Automatyki, Oficyna Wydawnicza Politechniki Warszawskiej, 2002; 2. Kaczorek T.: Teoria układów regulacji automatycznej. WNT Warszawa 1974; 3. Morecki A., Knapczyk J.: Podstawy robotyki, Teoria i elementy manipulatorów i robotów, WNT, Warszawa 1993	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		