



Subject card

Subject name and code	Automatic Control in Environmental Engineering, PG_00042498						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2021/2022		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Control Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jacek Zawalich					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	10.0	0.0	0.0	0.0	25
	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	25		3.0		50.0	78
Subject objectives	<p>The aim of the lecture is to provide basic information on the analysis and design of single-circuit and complex automation systems.</p> <p>The aim of the blackboard exercises is to acquire skills in the identification, description and design of single-circuit and complex automation systems.</p>						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K7_U13] can integrate knowledge in the areas of sanitary engineering, automatics, electronics, computer science, chemistry, biology and other disciplines in the formulation and solving tasks related to the design or modeling of sanitary systems and their components, using a systematic approach including non-technical aspects (including economic and legal)		The student solves problems in the field of design, modeling and simulation of automation systems and systems used in environmental engineering. The student conducts the analysis and synthesis of complex automation systems.			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject	
	[K7_W04] knows the basic automation methods, techniques, tools and systems used to solve complex engineering tasks in modeling, optimization and control of processes, objects and systems in environmental engineering		Student defines and distinguishes complex systems and automation processes. The student formulates the basic goals of industrial facilities control. The student knows the basic methods of research and evaluation of the operation of control systems.			[SW3] Assessment of knowledge contained in written work and projects	
Subject contents	The terms from scope of systems and technical processes control. Creating block diagrams. Functions and structures of automation systems. Mathematical description of systems. Linearization of mathematical models. Typical dynamic elements and their properties. Methods of identifying objects and control processes. Stability. Indicators of control quality. Classic control systems. Regulators: dynamics, selection of the type and settings of the regulator. Two-position and three-position control systems. Control of actuators: pumps, valves, gate valves, inverters. Examples of control systems. Industrial automation microprocessor systems: functions and structures. Examples of automation of industrial facilities.						
Prerequisites and co-requisites	The student should be prepared in mathematics and physics at a higher level						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	colloquium of lectures	50.0%	60.0%
	exercise	50.0%	40.0%
Recommended reading	Basic literature	Ogata K.: Modern Control Engineering. 4th edition. Prentice Hall 2002.	
	Supplementary literature	Raven F.H.: Automatic Control Engineering. McGraw-Hill 1988.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Converting block diagrams. Determination of output signals of typical automation objects. Tuning of PID regulators.		
Work placement	Not applicable		