



## Subject card

Subject name and code	System Identification II, PG_00048429						
Field of study	Automatic Control, Cybernetics and Robotics						
Date of commencement of studies	February 2022	Academic year of realisation of subject			2022/2023		
Education level	second-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			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Automatic Control -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Piotr Kaczmarek				
	Teachers		dr inż. Piotr Kaczmarek				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	15.0	0.0	15
	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	15	2.0		8.0	25	
Subject objectives	Practical applications of identification methods						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U03] can design, according to required specifications, and make a complex device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	The student can use dedicated tools for process identification.			[SU1] Assessment of task fulfilment		
	[K7_U21] can individually carry out an in-depth analysis of controlling, diagnostics and signal processing problems; and, to an advanced extent, is able to individually design, tune and operate automatic regulation, control and robotics systems; and use computers to control and monitor dynamic systems	The student can implement advanced signal processing algorithms.			[SU1] Assessment of task fulfilment		
	[K7_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of advanced technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	The student can design control systems based on identification algorithms.			[SU1] Assessment of task fulfilment		

Subject contents	<p>Project 1: Comparison of parametric and nonparametric spectrum estimation methods - 7 h. 1.1. Splitting recorded word into separate characters  1.2. Implementation of a Hamming window  1.3. Design of a program for parametric spectrum estimation using the Durbin-Levinson procedure  1.4. Design of a program for nonparametric spectrum estimation using the FFT procedure  1.5. Comparison of resulting spectrums  1.6. Description of the final program</p> <p>Project 2: Application of system identification to elimination of impulsive disturbances from audio signals - 8 h.  2.1. Design of a procedure for handling WAVE audio files  2.2. Design of a procedure for AR-based prediction of audio signals  2.3. Design of a procedure for prediction-based detection of impulsive disturbances  2.4. Design of a procedure for AR-based reconstruction of a fragment of an audio signal  2.5. Design of a disturbance elimination program using the available procedure  2.6. Evaluation of restoration results (using recordings provided by the supervisor)  2.7. Description of methods and algorithms used to solve the problem – written report  2.8. Description of the final program</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
Recommended reading	Basic literature	Söderström T. Stoica P. "Identyfikacja Systemów" PWN 1997	
	Supplementary literature	No requirements	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		