



Subject card

Subject name and code	System Identification I, PG_00048420						
Field of study	Automatic Control, Cybernetics and Robotics						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Automatic Control -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Maciej Niedźwiecki				
	Teachers		prof. dr hab. inż. Maciej Niedźwiecki				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30		2.0		18.0	50
Subject objectives	Students taking this course get acquainted with the methods of building and validation of simple mathematical models of dynamic systems/processes based on experimental data.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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	Students can apply identification methods to design adaptive control systems and adaptive measurement signal processing systems	[SU3] Assessment of ability to use knowledge gained from the subject
	[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 critically analyzes existing solutions and uses the experience gained.	[SU3] Assessment of ability to use knowledge gained from the subject
	[K7_W02] Knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study	Students know the basic methods of identifying stationary and extramural processes (objects and signals)	[SW1] Assessment of factual knowledge
	[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	Students know selected applications of process identification	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
Subject contents	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 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		
Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	50.0%	100.0%
Recommended reading	Basic literature	T. Sonderstrom, P. Stoica, " Identyfikacja systemów", PWN 1997	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		