

表 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	System Identification I, PG_00047406								
Field of study	Automatic Control, Cybernetics and Robotics								
Date of commencement of studies	October 2022		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	2		Language of instruction			English			
Semester of study	3		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	Projec	t	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 classes include plan	n didactic led in study	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_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				
	[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_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				
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 nonparametric 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	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	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						