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 2023	Academic year of realisation of subject	2024/2025
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	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_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	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[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

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