



Subject card

Subject name and code	Modelling and Identification, PG_00057474						
Field of study	MODELOWANIE I IDENTYFIKACJA						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group				
Mode of study	Full-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 -> Wydziały Politechniki Gdańskiej]						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Michał Grochowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	15.0	0.0	45
	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	45		10.0		20.0	75
Subject objectives	Presentation of advanced modern methods of systems modeling and estimation of their parameters. Analytical, fuzzy and neural technology will be presented.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W14] has knowledge of mathematical modelling, identification, optimisation, decision suport decision-making and control, knows methods of implementing advanced control algorithms in industrial equipment		Models dynamic objects and control systems. Selects an appropriate method for modeling, identifying and verifying objects and control systems		[SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym		
	[K7_U06] is able to plan the preparation and execution of experiments, measurements and computer simulations to evaluate the performance of automation and robotics tasks		Investigates simulation and experimental behavior of dynamic objects. Selects appropriate analytical and simulation methods to solve automation and robotics tasks.		[SU1] Ocena realizacji zadania		
Subject contents	Course content – lecture LECTURE Repetitorium basis of modeling and identification, range of degree studies. Fundamentals of probabilistic methods. Basics of mathematical modeling of real objects (statics and dynamics of processes). Elements of the verification models. Problems of optimal planning of experiments. Identification of the parameters on the basis of models (size and immeasurable nieobserwowalne). Identification of transmittance of complex systems and multi-dimensional. Identification of state equations. Tuning models. Fuzzy logic and identification of structures. Neural networks models. LABORATOTY Parameter identification of dynamic models with stationary and non-stationary parameters. Modeling and parameter identification using artificial neural networks. Fuzzy modeling and control.						
Prerequisites and co-requisites	Skills mathematical description of physical phenomena and complex technical processes. Knowledge of the subject Mathematics (0411200001, 0411200002), Numerical Methods (0411200009), optimization and decision making (0411200030) and the methods and basis of identification (0411210003)						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Midterm colloquium		50.0%		70.0%		
	Practical exercise		60.0%		30.0%		

Recommended reading	Basic literature	1. Stolec L.: Wstęp do metod optymalizacji i identyfikacji: ćwiczenia i laboratorium, Wyd. PG, Gdańsk 1985. 2. Piegat A.: Modelowanie i sterowanie rozmyte, Exit, Warszawa 1999 3. Gajek L., Kałużka M.: Wnioskowanie statystyczne, WNT, Warszawa 1994 4. Mańczak K.: Metody identyfikacji wielowymiarowych obiektów sterowania, WNT, Warszawa 1971.
	Supplementary literature	1. Lindgren B.: Elementy teorii decyzji, WNT, Warszawa 1977 2. Volk W.: Statystyka stosowana dla inżynierów, WNT, Warszawa 1973 3. Stoderstrom T., Stoica P.: Identyfikacja systemów, PWN 1997
	eResources addresses	
Example issues/ example questions/ tasks being completed	• identification of dynamic object model parameters using the least squares method; • designing of fuzzy reasoning system for control purposes; • designing of the neural network model for control purposes on the basis on measured data.	
Practical activities within the subject	Not applicable	

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