



Subject card

Subject name and code	Random Processes and Stochastic Control , PG_00049215						
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		Optional subject group 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		assessment		
Conducting unit	Department of Automatic Control -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Krzysztof Cisowski				
	Teachers		dr inż. Krzysztof Cisowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	15.0	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		4.0		16.0	50
Subject objectives	Practical verification of knowledge related to stochastic control.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions		Student can synthesize and simulate minimum-variance/ moving-average controller for a nontrivial plant.		[SU1] Assessment of task fulfilment		
	[K7_U07] can apply advanced methods of process and function support, specific to the field of study		Student can estimate power spectral density of a stochastic process using nonparametric and parametric methods. Student can form predictions of a stochastic process given its parametric model.		[SU1] Assessment of task fulfilment		
	[K7_K02] is ready to provide critical evaluation of received content and to acknowledge the importance of knowledge in solving cognitive and practical problems		Student understands the balance between the resolution and variance of periodogram-type estimators. Student understands the consequences of wrong model order selection during parametric spectrum estimation. Student understands the problem of Kalman filter tuning.		[SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	Lab 1: Nonparametric spectral estimation		
	Lab 2: Parametric spectral estimation		
	Lab 3: Prediction of stochastic processes		
	Lab 4: Kalman filter		
	Project: Synthesis and implementation of a minimumvariance-family controller		
Prerequisites and co-requisites	System identification, stochastic control.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Ocena wykonania zadania	51.0%	50.0%
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Recommended reading	Basic literature	K.J. Astrom, Introduction to Stochastic Control Theory, Prentice Hall.	
	Supplementary literature	T. Soderstrom, P. Stoica, System Identification, Prentice Hall.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		