GDAŃSK UNIVERSITY OF TECHNOLOGY

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 2024	Academic year of realisation of subject	2024/2025
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_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
[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_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

<table>
<tr><td>Subject contents</td><td>Lab 1: Nonparametric spectral estimation

Lab 2: Parametric spectral estiamtion

Lab 3: Prediction of stochastic processes

Lab 4: Kalman filter

Project: Synthesis and implementation of a minimumvariance-family controller</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>System identification, stochastic control.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Ocena wykonania zadania</td><td>51.0%</td><td>50.0%</td></tr>
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</td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>K.J. Astrom, Introduction to Stochastic Control Theory, Prentice Hall.</td></tr>
<tr><td>Supplementary literature</td><td>T. Soderstrom, P. Stoica, System Identification, Prentice Hall.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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