GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Adjustment calculus, PG_00044802		
Field of study	Geodesy and Cartography		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-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	Polish
Semester of study	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor		
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	0.0	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	6.0	49.0	100

Subject objectives

Get acquainted with the elements of matrix algebra and the basics of statistical analysis used in the alignment calculus.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W03] knows and understands the principles of mathematical statistics described in the examples of the adjustment computations	Knowledge of mathematical statistics used in the alignment calculus.	
[K6_U03] can use a adjustment calculations to analyze the results of measurements and determine their accuracy	The ability to verify the results of measurements and their analysis with the use of alignment calculus methods.	
[K6_U01] can apply the principles of physics and mathematics to a simple verification of measurement and computational methods and their results	The ability to verify the obtained calculation results.	

Subject contents

1. Matrix algebra:
- basic matrix operations;
- inverse of matrices;
- distribution of matrices into triangular factors;
- solving systems of equations using the marked and indefinite method.

2. Probabilistic basics of the equalization methods:
- one-dimensional random variables (discret and continuous);
- zero-one, binomial, normal distribution;
- two-dimensional random variables (step and continuous);
- uniform and normal distribution;
- descriptive parameters of a random variable.

3. Implementation and solving problems in the field of matrix algebra and probabilistic equalization methods in the MatLab / Octave environment

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Prerequisites:
• basics of matrix operations (determinant, addition, multiplication)
• basics of differential and integral calculus</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Colloquium 1</td><td>60.0%</td><td>50.0%</td></tr><tr><td>Colloquium 2</td><td>60.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Z. Wiśniewski, 2005: Alignment calculus in geodesy (with examples). Wydawnictwo UWM. Olsztyn.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">A. Jagielski, 2007: Geodesy II. Wydawnictwo P.W.STABILL. Wydanie 2.</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">• determine the inverse of matrices
• decompose a matrix into triangular factors
• solve the system of equations using the marked and indefinite method
• present descriptive parameters of a random variable</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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