



## Subject card

Subject name and code	Adjustment calculus, PG_00044802						
Field of study	Geodesy and Cartography						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2027/2028		
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 -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor						
	Teachers						
Lesson types	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	<p>Course content – lecture</p> <p>1. Matrix algebra:</p> <ul style="list-style-type: none"> <li>• basic matrix operations;</li> <li>• inverse of matrices;</li> <li>• distribution of matrices into triangular factors;</li> <li>• solving systems of equations using the marked and indefinite method.</li> </ul> <p>2. Probabilistic basics of the equalization methods:</p> <ul style="list-style-type: none"> <li>• one-dimensional random variables (discret and continuous);</li> <li>• zero-one, binomial, normal distribution;</li> <li>• two-dimensional random variables (step and continuous);</li> <li>• uniform and normal distribution;</li> <li>• descriptive parameters of a random variable.</li> </ul> <p>3. Implementation and solving problems in the field of matrix algebra and probabilistic equalization methods in the MatLab / Octave environment</p>											
Prerequisites and co-requisites	<p>Prerequisites:</p> <ul style="list-style-type: none"> <li>• basics of matrix operations (determinant, addition, multiplication)</li> <li>• basics of differential and integral calculus</li> </ul>											
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <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> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Colloquium 1	60.0%	50.0%	Colloquium 2	60.0%	50.0%
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Colloquium 2	60.0%	50.0%										
Recommended reading	Basic literature	Z. Wiśniewski, 2005: Alignment calculus in geodesy (with examples). Wydawnictwo UWM. Olsztyn.										
	Supplementary literature	A. Jagielski, 2007: Geodesy II. Wydawnictwo P.W.STABILL. Wydanie 2.										
	eResources addresses											
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• determine the inverse of matrices</li> <li>• decompose a matrix into triangular factors</li> <li>• solve the system of equations using the marked and indefinite method</li> <li>• present descriptive parameters of a random variable</li> </ul>											
Practical activities within the subject	Not applicable											

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