



## Subject card

Subject name and code	APPLIED USE OF SURVEYING DATA ADJUSTMENT AND ANALYSIS, PG_00044810						
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	4	ECTS credits			5.0		
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	30.0	0.0	0.0	0.0	60
	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	60		9.0		56.0	125
Subject objectives	Teach students the practical application of alignment calculus methods to evaluate geodetic measurements, including analyzing results and estimating their accuracy.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U03] can use a adjustment calculations to analyze the results of measurements and determine their accuracy		The student is able to put into practice the methods of alignment calculus				
	[K6_W03] knows and understands the principles of mathematical statistics described in the examples of the adjustment computations		The student knows and understands the elements of matrix calculus, statistics and probability necessary for solving tasks from the alignment calculus				
Subject contents	1. Parametric method 2. Conditional method 3. Mixed methods: - Parametric method with conditions binding parameters - Conditional method with parameters 4. Sequential alignment						
Prerequisites and co-requisites	Knowledge of mathematics in the field of matrix calculus, statistics and probability, presented in the framework of the alignment calculus subject.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Solution of given tasks		60.0%		100.0%		
Recommended reading	Basic literature		L.W. Baran, Theoretical foundations for the analysis of geodetic survey results, ed. PWN, 1999, Warsaw Z. Wiśniewski, Alignment Calculus in Geodesy (with examples). Ed. UWM, 2009, Olsztyn				
	Supplementary literature		Z. Wiśniewski, Matrix algebra and mathematical statistics in alignment calculus (theory and tasks), ed. UWM, 2000, Olsztyn				

	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	The distance to 4 geodetic points with given coordinates, and angles between them were measured. The following results were obtained ( $d_1, d_2, d_3, d_4, A_{12}, A_{23}, A_{34}$ ). The mean error of distance measurement was $m_d$ and angle measurement $m_A$ . Calculate the x, y coordinates of the point and their estimated accuracy.	
Work placement	Not applicable	

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