



Subject card

Subject name and code	SPECIAL GEODETIC MEASUREMENTS A, PG_00044850						
Field of study	Geodesy and Cartography						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2026/2027		
Education level	first-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	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			6.0		
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	15.0	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		81.0	150
Subject objectives	Teaching students issues related to the deformation analysis of geodetic network.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W07] has a well-established knowledge and understands concepts in the field of engineering geodesy including the use of calculations and measurements methods carried out with the use of geodetic instruments and photogrammetric and remote sensing technologies related to geodetic support for investment, surveying and inventory measurements and photogrammetry with remote sensing		[K6_W07] The student performs calculations by using the least squares method,				
	[K6_W11] understands the concepts and has in-depth knowledge in the field of geodetic building monitoring, extended with basic knowledge in the field of statics and dynamics of engineering structures		[K6_W11] Performs geodetic measurements and carries out appropriate calculations related to geodetic monitoring of buildings,				

Subject contents	<p>Lecture topics</p> <ol style="list-style-type: none"> 1. Development of geodetic observations by using the least squares method, 2. Free adjustment of geodetic networks, 3. Geodetic measurements of displacements - introduction to the issue, 4. Designing of a control network, 5. Selected measurement methods used in determining displacements, 6. Selected issues in the field of the reliability theory of geodetic networks, 7. Adjustment of geodetic networks in constrained datums, 8. Initial adjustment of observations, 9. Identification of stable reference points, 10. Estimation of displacements of controlled points, 11. Assessment of the significance of the designated displacements, 12. Modern methods of deformation analysis of geodetic network - introduction to the issue, 13. The method of the global congruency test (GCT), 14. Weighted iterative S-transformation method, 15. Geometric interpretation of determined displacements. <p>Laboratory topics</p> <p>Performing geodetic calculations regarding:</p> <ul style="list-style-type: none"> - adjustment of geodetic observations by using the least squares method, - free adjustment of observations by using the least squares method, - preliminary development of geodetic observations in the context of diagnostics and the location of potential outliers, - identification of stable reference points by using the Fredericton approach, - calculation of displacements of controlled points with an assessment of the significance of the determinations made. <p>Exercise topics</p> <p>Performing the deformation analysis of the angular-linear network designed in the area of the water dam in Montsalvenes (Switzerland).</p>														
Prerequisites and co-requisites	Independent use of traditional and modern geodetic instruments, ability to work in a team, mastered basics of matrix calculus and methods of developing of geodetic observations.														
Assessment methods and criteria	<table border="1" data-bbox="448 994 1489 1182"> <thead> <tr> <th data-bbox="448 994 794 1032">Subject passing criteria</th> <th data-bbox="794 994 1141 1032">Passing threshold</th> <th data-bbox="1141 994 1489 1032">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 1032 794 1070">Final exam</td> <td data-bbox="794 1032 1141 1070">60.0%</td> <td data-bbox="1141 1032 1489 1070">100.0%</td> </tr> <tr> <td data-bbox="448 1070 794 1126">Exercise. Correct execution of the geodetic project.</td> <td data-bbox="794 1070 1141 1126">100.0%</td> <td data-bbox="1141 1070 1489 1126">0.0%</td> </tr> <tr> <td data-bbox="448 1126 794 1182">Laboratories. Passing all exercises.</td> <td data-bbox="794 1126 1141 1182">100.0%</td> <td data-bbox="1141 1126 1489 1182">0.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Final exam	60.0%	100.0%	Exercise. Correct execution of the geodetic project.	100.0%	0.0%	Laboratories. Passing all exercises.	100.0%	0.0%
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Laboratories. Passing all exercises.	100.0%	0.0%													
Recommended reading	<p>Basic literature</p> <p>Supplementary literature</p> <p>eResources addresses</p>	<p>Wiśniewski Z. 2016. Rachunek wyrównawczy w geodezji z przykładami,</p> <p>Wiśniewski Z. 2013. Zaawansowane metody opracowania obserwacji geodezyjnych z przykładami,</p> <p>Prószyński W., Kwaśniak M. 2015. Podstawy geodezyjnego wyznaczania przemieszczeń</p> <p>Koch K.R. 1999. Parameter estimation and hypothesis testing in linear models,</p> <p>Caspary W. F. 2000. Concepts of network and deformation analysis</p> <p>Prószyński W., Kwaśniak M. 2002. Niezawodność sieci geodezyjnych</p> <p>Adresy na platformie eNauzanie:</p>													
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. The geodetic control network design, 2. Testing of the stability of potential reference points, 3. Determination of displacements of controlled points, 4. Diagnostics of observational material and localization of potential outliers. 														
Work placement	Not applicable														