



Subject card

Subject name and code	Geomatics, PG_00061770						
Field of study	Geodesy and Cartography						
Date of commencement of studies	October 2026	Academic year of realisation of subject				2026/2027	
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	1	Language of instruction				Polish	
Semester of study	2	ECTS credits				3.0	
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	dr inż. Jakub Szulwic					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	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	24.0	75		
Subject objectives	The student understands the basics and has the ability to apply the principles of analytical description of the Earth in various areas of geodesy and cartography. The student uses spatial reference systems, geodetic coordinate systems, types of maps used in geodesy and cartography and related fields, taking into account the current legal status. The student becomes familiar with modern methods of surveying, satellite / aerial imaging and GNSS positioning.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W05] knows and understands the principles in the field of geomatics, mathematical and thematic cartography, including reference systems and coordinate frames associated with cartographic elaborations, and has knowledge about establishing and modernizing geodetic networks, taking into account the current legal status	The student knows and defines reference systems, coordinate systems (in force in the Republic of Poland and in the European Union), types of maps used in geodesy and cartography and related fields. The student understands the basics of applying the principles of analytical description of the Earth in various areas of geodesy and cartography. The student knows the current legal status in the field of Geodetic and Cartographic Law.			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	[K6_U06] can solve geodetic tasks and select measurement methods for typical engineering tasks including the curvature of the Earth and the impact of gravity	The student can choose the measuring equipment depending on the task. Understands the effects of measurement errors depending on the equipment and type of measurement. Student understands the influence of Earth's curvature and distinguishes between normal and ellipsoidal height systems.			[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		

Subject contents	<p>Course content – lecture</p> <p>Modern measuring technologies in geodesy and cartography - a review of solutions - 3 hours. Geodetic and cartographic systems - 6 hours. Foucault's pendulum - operating principle, connection with the Earth's rotation; a look in the context of the introduction to geodetic gravimetry 3 hours. Earth as a measuring surface: introduction to physical geodesy, cartographic mapping, the concept of measurement accuracy, methods of geodetic measurements - 3 hours.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Assessment of factual knowledge obtained during lectures (test).	60.0%	50.0%
	Assessment of the presentation in the field of measurement methods.	50.0%	25.0%
	Assessment of the practical task carried out in the field.	50.0%	25.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Piotr Banasik, Piotr Cichociński, Józef Czaja, Władysław Góral, Krystian Kozioł, Robert Krzyżek, Jacek Kudrys, Marcin Ligas, Bogdan Skorupa. Podstawy geomatyki. Wydawnictwo AGH, 2011. ISBN: 978-83-7464-320-7 2. Stefan Przewłocki. Geomatyka. Wydawnictwo PWN, 2019. ISBN 9788301155292 	
	Supplementary literature	<p>Current press materials and articles indexed in journal databases (Web of Science, Scopus or Google Scholar):</p> <p>https://scholar.google.pl/schhp?hl=pl</p> <p>http://www.webofknowledge.com/ and https://www.scopus.com/ - access via https://pg.edu.pl/biblioteka-pg/alfabetycznie</p> <p>and</p> <p>https://geoforum.pl/geodezja/wprowadzenie</p> <p>https://geoforum.pl/geodezja/systemy-uklady</p> <p>https://geoforum.pl/geodezja/transformacja</p> <p>https://geoforum.pl/geodezja/grawimetria</p>	
	eResources addresses		

<p>Example issues/ example questions/ tasks being completed</p>	<p>I:</p> <p>Please provide definitions: quasi geoid, orthodrome, ellipsoidal height.</p> <p>Please compare the geodetic coordinate systems: 1965 and PL-2000.</p> <p>Please characterize the azimuth mapping and provide the shape of the meridians and parallels grid for one example (please name the example, assigning to the mapping type).</p> <p>Please describe mapping distortions in the PL-2000 system. What is standardization in geodesy?</p> <p>Please provide examples of at least five standards used in geodesy.</p> <p>II</p> <p>Please provide definitions: geoid, loksodroma, normal height.</p> <p>Please compare the geodetic coordinate systems: 1942 and PL-2000.</p> <p>Please characterize the cylindrical projection and give the shape of the meridians and parallels grid for one example (please name the example, assigning to the projection type).</p> <p>Please describe the mapping distortions in 1965 (for zones 1-4).</p> <p>What are the reasons for using normalization in geodesy?</p> <p>Please provide examples of at least five standards used in geodesy.</p>
<p>Practical activities within the subject</p>	<p>Not applicable</p>

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