GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Geomatics B, PG_00039998						
Field of study	Geodesy and Cartography						
Date of commencement of studies	February 2024		Academic year of realisation of subject	2024/2025			
Education level	second-cycle studies		Subject group				
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	4.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jerzy Pyrchla				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	25.0	10.0	0.0	15.0	0.0	50
	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	50		10.0	40.0	100	
Subject objectives	To acquaint students with the issues of obtaining, analyzing, interpreting and practical application of geoinformation through the interconnection of geometric and physical aspects from global to regional problems.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U07] can calculate equipotential surfaces, obtain information from the official websites, created for the needs of geodesy and geodynamics, knows how to use the properties of the actual vector field the force of gravity of the Earth to carry out precise geometric levelling and levelling satellite	Is able to acquire and interpret the global and regional gravimetric data from existing databases.	[SU4] Assessment of ability to use methods and tools
[K7_W11] knows the basics of hydrography theory and practice, construction and operation of echosonars and sonars, methods of information recording and displaying; principles of depth measurement and conducting marine measurements; knows the theory and practice of bathymetric measurements	Has a knowledge about importance of the bathymetric and gravimetric data for the geodetic works in coastal zone.	[SW1] Assessment of factual knowledge
[K7_W10] has knowledge of the physical fundamentals in geodesy, geodetic geometry, earth's gravity field and its properties, geodetic gravimetry, gravimetric and astronomical-surveying methods, geodetic networks, precision leveling networks, integrated networks	Knows the rules of defining of the geometric and geophysical issues connected with terrain geodetic infrastructure.	[SW1] Assessment of factual knowledge
[K7_U08] can use echoprobes and sonars to measure depth, interpret, calculate the hotfixes and evaluate the accuracy of the depth measurements; use automated systems to carry out hydrographic measurements, plan, prepare the data, materials and equipment for Hydrographic work;	Has the ability to use knowledge about hydrographic data processing to get reliable results and match them with the height system.	[SU2] Assessment of ability to analyse information

Subject contents

Introduction; Basics of potential theory; Expression on the potential of the equipotential ellipsoid; Surface spherical harmonics; Height system; Altimetry; gravimetry; Instruments for gravimetric measurements; Noise reduction of the gravimetric signal; Gravimetric anomalies. Reductions and corrections; Deviation of the vertical; The tides of the earth's crust.

Prerequisites and co-requisites

Knows problems of higher Geodesy.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	60.0%	70.0%
raport	80.0%	30.0%

Recommended reading

Basic literature	Kazimierz Czarnecki, Geodezja współczesna. Wyd. PWN 2014; Adam Łyszkowicz, Geodezja fizyczna. Wyd. Uniwersytetu Warmińsko-Mazurskiego w Olsztynie 2012; Marcin Barlik, Andrzej Pachuta, Geodezja fizyczna i grawimetria geodezyjna. Teoria i praktyka. Oficyna Wydawnicza Politechniki Warszawskiej 2007; Martin Vermeer, Physical Geodesy. https://users.aalto.fi/ mvermeer/mpk-en.pdf; Hofmann-Wellenhof B., Moritz H., Physical Geodesy, Institut für Navigation und Satellitengeodäsie Technische Universität Graz, Graz, Austria, 2006; Barlik M., Pomiary grawimetryczne w geodezji. OWPW 2001; Barlik M., Wstęp do teorii figury Ziemi, 1995; Stefan Przewłocki, Geomatyka. Wyd.: naukowe PWN, Warszawa 2009.
Supplementary literature	Articles in scientific journals. Eg. Journal of Geodesy; Marine Geophysical Research; Journal of Geodynamics; Journal of the Geodetic Society of Japan
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Characterize the measurements made at the LIGO Laser Interferometer Gravitational Wave Observatory. Characterize the potential of the body as Newton's integral. Characterize the Poisson and Laplace equations related to the potential of a solid. Introduce functions called solid spherical harmonics and functions called surface harmonics (Laplace). Give Dirichlet's boundary problem and their solutions to the sphere. Please, write down the radial derivative of the harmonic function. Present the solution of the Laplace equation in ellipsoidal coordinates

Work placement

Not applicable