

表 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Satellite and space navigation systems, PG_00044838							
Field of study	Geodesy and Cartography							
Date of commencement of studies	October 2020		Academic year of realisation of subject			2022/2023		
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	3		Language of instruction			Polish		
Semester of study	6		ECTS credits			3.0		
Learning profile	general academic profile		Assessment form			exam		
Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering							
Name and surname of lecturer (lecturers)	Subject supervisor dr inż. Jakub Szulwic							
	Teachers		dr inż. Jakub Szulwic					
		mgr inż. Kamil Łapiński						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	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		24.0		75
Subject objectives	The aim of the course "Satellite and Space Navigation Systems" is to teach students about issues related to space and satellite navigation systems. The main emphasis is placed on global satellite navigation systems (GNSS). Students are familiarized with position determination techniques, factors that affect their accuracy, data processing methods, and more. Additionally, other satellite techniques such as DORIS, SLR, and altimetry will be presented.							
Learning outcomes	Course outcome		Subject outcome			Method of verification		
	[K6_U04] can use contemporary geodetic instruments, including automation of measurements, data transmission and processing in a computer-instrument system with the use of computer networks		The student is able to use modern GNSS receivers for navigation as well as to perform geodetic tasks. The student is also able to process observations using international GNSS data exchange formats.			[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task		
	[K6_W03] knows and understands the principles of mathematical statistics described in the examples of the adjustment computations		The student is familiar with and understands the methods of satellite measurements used in geodesy and navigation. They understand the mathematical model of absolute (SPP) and differential (kinematic/static) positioning.			[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 is familiar with the available satellite positioning methods used in modern geodesy and is able to select the appropriate method for a given geodetic task.			[SU1] Assessment of task fulfilment		

Subject contents	 Classification and description of the structure of modern GNSS positioning systems GNSS satellite signals Determination of satellite position in orbit Determination of absolute receiver position Sources of errors in satellite measurements Tropospheric correction Ionospheric correction Differential positioning Applications of GNSS 						
Prerequisites and co-requisites	 Knowledge of adjustment computations Basic knowledge of mathematics and physics. 						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	laboratorium	60.0%	40.0%				
	Exam	60.0%	60.0%				
Recommended reading	Basic literature	1) Alfred Leick, GPS SATELLITE SURVEYING, JOHN WILEY & SONS, 20042) Hoffmann-Wellenhof B., Lichtenegger H., Collins J.,, GPS Theory and Practice, SpringerWienNe					
	Supplementary literature	1) Misra P., Enge P., (2001), Global Positioning System Signals, Measurements, and Performance, Ganga - Jamuna Press, Lincoln, Massachusetts, USA - second edition (2006)"2) Leick A., (1995), GPS Satellite Surveying, John Wiley & Sons. Inc					
	eResources addresses	Podstawowe					
		https://gssc.esa.int/navipedia/index.php/Main_Page - The reference for Global Navigation Satellite Systems					
		Uzupełniające					
		Adresy na platformie eNauczanie:					
Example issues/ example questions/ tasks being completed	 Define and describe satellite altimetry. List and describe the segments of GPS and Galileo. Characteristics of functioning satellite systems (GNSS). Kepler's law for artificial satellites of the Earth: definition, characteristics. 						
Work placement	Not applicable						