GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Geodesy and satelite navigation in transport , PG_00044578		
Field of study	Transport		
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	3	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. inż. Dariusz Tomaszewski	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	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	5.0	25.0	75

Subject objectives

To familiarize with geodetic and satellite navigation techniques used in transport.

Learning outcomes

Course outcome	Subject outcome	Method of verification

Subject contents

LECTURES: Basic concepts of geodesy and navigation. Earth as a reference surface for measurements. Reference and coordinate systems used in navigation and geodesy. Geodetic instruments - purpose, functions and structure. The genesis of geodesy and satellite navigation systems. The movement of artificial satellites of the Earth. Global Positioning Systems: GPS (Global Positioning System), GLONASS (GLObal NAvigation Satellite System), Galileo. GNSS code receivers, their purpose, structure and functions. GNSS augmentation systems: EGNOS, WAAS and DGPS. Phase GNSS measurements. Active geodetic networks. Applications of global navigation satellite systems (GNSS) in transport.
LABORATORIES: Planning a GPS measurement campaign with the use of GNSS constellation simulation software. Measurement evaluation of the availability and errors of satellite positioning. Monitoring a moving vehicle using a GNSS receiver.

Prerequisites and co-requisites

Basic knowledge of physics and mathematics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Colloquium	60.0%	50.0%
Laboratory exercises	90.0%	50.0%

Recommended reading	Basic literature	1. Łyszkowicz A., Geodesy, or the art of measuring the Earth, Wydawnictwo UWM w Olsztynie, 2006. 2. Lamparski J., Świątek K., GPS in surveying practice, Wydawnictwo Gall, Olsztyn 2007. 3. Specht C., GPS System, Biblioteka Nawigacji nr 1, Wydawnictwo “Bernardinum”, Pelplin, 2007. 4. Zieliński J., i in. Galileo Navigation System, WKiŁ, Warszawa, 2006.
	Supplementary literature	1. ICD - GPS – 200, NAVSTAR GPS Joint Program Office, Navtech, February 1995. 2. ICD-GALILEO, Galileo Open Service Signal In Space, Interface Control Document (OS SIS ICD), Draft 0, European Space Agency / Galileo Joint Undertaking, 2006. 3. ICD-GLONASS, Global Navigation Satellite System GLONASS – Interface Control Document, Moscow, 2002. 4. SPS, Global Positioning System (GPS), Standard Positioning Service, Signal Specification, Department of Defence, Positioning/Navigation Executive Commitee, November 5. 1993 5. SPS, Global Positioning System Standard Positioning Service, Performance Standard, Assistant Secretary of Defense, 2001. 6. SPS, Global Positioning System Standard Positioning Service, Performance Standard, 5h edition, April 2020.
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Discuss the architecture and functions of individual segments of GPS, Glonass, Galileo, BeiDou systems. 2. Describe the idea of code and phase pseudorange measurements. 3. Present the idea of fixing the position in satellite navigation systems and discuss the factors influencing the accuracy of determinations. 4. Present the idea of differential measurements and describe the selected DGNSS system.	
Work placement	Not applicable	

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