GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Navigation Systems, PG_00048381		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Marine Electronic Systems -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Marszal	
	Teachers	dr hab. inż. Jacek Marszal	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30	4.0	16.0	50

Subject objectives	Review of issues related to the shape of the Earth and its projections onto maps, especially digital maps. Introduction to the basics of navigation (familiarization with nomenclature and classical methods of navigation). Review of classical navigation devices and systems. GPS satellite navigation and other satellite navigation systems. Application of satellite navigation systems in geodesy. Systems of local hydroacoustic underwater navigation.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W10] knows and understands, to an increased extent, the basic processes occurring in the life cycle of equipment, objects and technical systems, as well as methods of supporting processes and functions, specific to the field of study	The student knows the methods of mapping the shape of the Earth onto a digital map. Understands the basic principles of classical maritime navigation. The student knows the basics of the functioning and application of GPS satellite navigation systems. Is able to analyze and complete a local hydroacoustic navigation system. Describes the operation of radar as a navigation device used in maritime and air navigation.	[SW1] Assessment of factual knowledge
	[K7_W03] knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	Student defines tasks and basic concepts of navigation. He discusses mapping methods and maps. He classifies and describes the classical methods of navigation and technical methods for their implementation. He presents the work principles and performance of navigation devices. He explains principles of work and gives the parameters of satellite navigation system GPS. He discusses principles of functioning of hydroacoustic navigation systems and their applications. He describes the operation of ILS in aviation navigation.	[SW1] Assessment of factual knowledge

Subject contents

1. Introduction, basic information about navigation and indication of additional literature.Shape and models of the Earth, geographic coordinates.
2. Projection systems, digital map, data formats.
3. Directions in navigation.
4. Review of classic marine navigation systems (terrestrial magnetism, magnetic compasses, classic and fiber optic gyrocompass, logs).
5. GPS satellite navigation system.
6. Other satellite navigation systems.
7. Application of satellite navigation in geodesy.
8. Local underwater hydroacoustic navigation systems.
9. ILS landing support systems.
10. Summary.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test colloquium	50.0%	70.0%
presence & activity	0.0%	30.0%

Recommended reading

Basic literature

1. J. Narkiewicz, Podstawy układów nawigacyjnych, WKŁ Warszawa 1999.
2. J. Narkiewicz, Globalny system pozycyjny GPS, budowa, działanie, zastosowanie, WKŁ Warszawa 2003.
3. J. Narkiewicz, GPS i inne satelitarne systemy nawigacyjne, WKŁ Warszawa 2007.
4. F. Wróbel, Vademecum nawigatora, Trademar Gdynia 1996.
5. J. Jurdziński, Podstawy nawigacji morskiej, Fundacja Rozwoju Wyższej Szkoły Morskiej Gdynia 2003.
6. W. Kosiński, Geodezja, Wydawnictwo SGGW Warszawa 1995.
7. K. Czarnecki, Geodezja współczesna w zarysie, Wydawnictwo Wiedza i Życie, Warszawa 1994. \
8. K. A. Saliszczew, Kartografia ogólna, Wydawnictwo Naukowe PWN, Warszawa 1998.

Supplementary literature

1. Tim Bartlet, An Introduction to Navigation, Royal Yachting Association, 2009
2. Eliot Kaplan, Christopher Hegarty, Understanding GPS/GNSS: Principles and Applications, Artech House Publishers, 2000.

eResources addresses: Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Work placement: Not applicable