GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Open-air Laboratory, PG_00048378		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Optional 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 mgr inż. Aleksander Schmidt dr inż. Piotr Grall	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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	The aim of the course is to familiarize students with the marine electronics equipment and systems in real operating conditions on vessels.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of advanced technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	The student supports built-in real-time systems in real operating conditions, examines their parameters and functionality and interprets the obtained results. He researches the GPS satellite navigation system and guides the measuring boat with the use of a digital map. Determines the position of moving objects under water using a hydroacoustic local navigation system with a super-short base. It examines the properties and compares the classical and electronic compass indications and measures the velocity with an induction logo. He measures the depth profiles of a basin with a navigational and hydrographic echosounder and examines bottom sediments with a dual-frequency echo sounder. Observes the underwater situation using a pulsed sonar. It guides navigation and observes the coastline using radar. He studies the ultrasonic underwater communication system.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
	K7_K02	The student supports built-in real-time systems in real operating conditions, examines their parameters and functionality and interprets the obtained results. He researches the GPS satellite navigation system and guides the measuring boat with the use of a digital map. Determines the position of moving objects under water using a hydroacoustic local navigation system with a super-short base. It examines the properties and compares the classical and electronic compass indications and measures the velocity with an induction logo. He measures the depth profiles of a basin with a navigational and hydrographic echosounder and examines bottom sediments with a dual-frequency echo sounder. Observes the underwater situation using a pulsed sonar. It guides navigation and observes the coastline using radar. He studies the ultrasonic underwater communication system.	[SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice

Course outcome	Subject outcome	Method of verification
[K7_U06] can analyse the operation of components, circuits and systems related to the field of study; measure their parameters; examine technical specifications; interpret obtained results and draw conclusions	The student supports built-in real-time systems in real operating conditions, examines their parameters and functionality and interprets the obtained results. He researches the GPS satellite navigation system and guides the measuring boat with the use of a digital map. Determines the position of moving objects under water using a hydroacoustic local navigation system with a super-short base. It examines the properties and compares the classical and electronic compass indications and measures the velocity with an induction logo. He measures the depth profiles of a basin with a navigational and hydrographic echosounder and examines bottom sediments with a dual-frequency echo sounder. Observes the underwater situation using a pulsed sonar. It guides navigation and observes the coastline using radar. He studies the ultrasonic underwater communication system.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment

Subject contents

1. Performance testing of the GPS satellite navigation system.
2. Practical exercises of navigation systems. Navigation witha digital map and GPS system on motor boat.
3. Hydroacoustic local navigation system with a super short base line - determining the position of moving objects under water.
4. Magnetic Compasses - study and comparison of the properties of the compass classical and electronic.
5. Study the properties of the electromagnetic ship log.
6. Measurement using echo sounder. Echo sounder bottom profiles survey.
7. Dual-frequency echo sounder examination of bottom sediments.
8. Sound speed profiler - examination of influence of sound speed distribution on acoustic waves propagation in the water.
9. Sonar measurements. Miniature pulse sonar with mechanical scanning - observations and searching for underwater objects.
10. Radar - navigation and observation of coast line.
11. Ultrasound underwater communication system - comparison of communications via hydrotelephone and walkie-talkie.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Practical exercise	70.0%	100.0%

Recommended reading

Basic literature	1. Skolnik M. Radar Handbook. MaGraw-Hill Boston 1990 2. Salamon R. Systemy hydroloakcyjne. GTN Gdańsk 2006 3. Narkiewicz J. Globalny system pozycyjny. WKŁ Warszawa 2003
Supplementary literature	No requirements
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Work placement

Not applicable