University of Gdańsk

Subject card

Subject name and code	Fundamentals of Radiolocation - lecture, PG_00201136						
Field of study	Marine Hydrography						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2028/2029			
Education level	Bachelor's studies		Subject group	Obligatory subject group 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	5		ECTS credits	1.0			
Learning profile	practical		Assessment form	credit			
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Piotr Bekier				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	18.0	0.0	0.0	0.0	0.0	18
	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	18		1.0		6.0	25
Subject objectives	To introduce students to: • concepts and definitions in the field of radiolocation, formation and propagation of EM waves, • classification and division of radar devices, radiolocation methods, physical basis for detecting objects and methods used in radiolocation to determine linear and angular quantities, • construction and principles of operation of radar devices, • technical and tactical parameters of radar devices and the interdependencies between them.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[HML3-W01] knows and understands, at an advanced level, selected facts, phenomena and processes, as well as methods and theories concerning them, explaining the complex relationships between them, constituting basic general knowledge in the field of scientific disciplines forming the theoretical foundations specific to the field of study	knows and understands at an advanced level: - theoretical foundations of maritime radiolocation, - basic concepts and definitions in the field of radiolocation and principles of electromagnetic field propagation	[SW4] test/exam - oral or written
[HML3-U08] is able to independently use the professional literature available in traditional and electronic form, make an assessment, critical analysis and synthesis as well as the correct interpretation of the information obtained	is able to identify and describe how a radar's technical parameters affect its tactical performance	[SU4] test/exam - oral or written
[HML3-W07] knows and understands, at an advanced level, principles of operation and use of measuring instruments used in professional activities related to the field of study, including the principles of their calibration and assessment of accuracy	knows and understands at an advanced level: - classification of radar devices, physical basis for detecting radar objects and methods of determining linear and angular quantities used in radiolocation, - general structure and principle of operation of radar devices and their technical and tactical parameters	[SW4] test/exam - oral or written

Subject contents

Basic concepts and definitions. Formation and propagation of electromagnetic field. Division of the spectrum of electromagnetic waves. Classification and division of radar devices. Description and examples of practical applications of radiolocation methods. Secondary radiation of an electromagnetic wave by an object. Characteristics of types of electromagnetic wave reflections. Definition of effective reflection surface. Characteristics of methods for determining linear quantities - distances. Characteristics of methods for determining angular quantities - course angle and elevation angle. Systems and assemblies of ship radar devices. Principle of operation of impulse radar. Characteristics of technical and tactical parameters of radar devices. Characterization of factors influencing the maximum detection range of radar devices. Analysis of the impact of radar technical parameters on other tactical parameters. Radar indicator.

Prerequisites and co-requisites

1. Knowledge of physics at high school level.
2. Knowledge of the basics of electrical engineering

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
test	51.0%	50.0%
colloquium	51.0%	50.0%

Recommended reading

Basic literature	1. KOKOT K.: Podstawy radiolokacji morskiej. AMW, Gdynia 1982. 2. MARSZAŁKOWSKI J.: Radiolokacja morska. Część I. AMW, Gdynia 2004.
Supplementary literature	1. SHARMA K. K.: Introduction to Radar Systems. S.K. Kataria & Sons, New Delhi 2015. 2. SKOLNIK M.: Radar Handbook. McGraw Hill, 2008.
eResources addresses	

Example issues/ example questions/ tasks being completed

What technical parameters of the radar and how do they affect its maximum detection range in the ..... method? What types of radar antennas do you know? What is receiver sensitivity? Derive the basic equation for the energy range of a radar operating using the ..... method. What methods do you know to determine angular coordinates? What methods do you know to determine distance? What does the pulse repetition frequency depend on?

Work placement

Not applicable

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