University of Gdańsk

Subject card

Subject name and code	Navigational Equipment - ARPA course - classes, PG_00201141						
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 Optional subject group Subject group related to practical vocational preparation		
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		0.0		
Learning profile	practical		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Artur Makar				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	4.0	0.0	0.0	0.0	4
	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	4		0.0		2.0	6
Subject objectives	To teach the principles of operation, use, and effective application of ARPA systems, with particular emphasis on their limitations, accuracy, and the specification of navigational information display.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[HML3-W16] knows and understands engineering standards and norms specific to the field of study, in particular those recommended by IHO and IMO	knows at an advanced level the IMO requirements regarding radar and ARPA devices, the dangers associated with excessive reliance on ARPA data.	[SW5] implementation of a problem task
[HML3-U11] is able to use navigation devices, means of technical observation and communication as well as measuring instruments, as well as apply in practice various techniques of measurement and observation in the field of professional activity related to the field of study	is able to: - optimize radar display settings, correctly interpret radar images, efficiently identify echoes of objects on the screen, and accurately perform radar measurements using available methods while minimizing errors; - obtain information about objects visible on the radar screen, initiate target tracking, correctly interpret data provided by the ARPA system, assess collision situations, plan and execute collision avoidance maneuvers, and evaluate the effectiveness of actions taken; - use ARPA and other navigational devices to ensure safe navigation and collision avoidance in various navigational waters, with particular emphasis on ARPA–AIS–ECDIS data exchange, and take into account the errors and limitations of ARPA systems	[SU6] demonstration of practical skills
[HML3-U18] is able to work individually and in team, manage the work of the team, in particular comply with health and safety regulations and ergonomics	is able to use ARPA and other navigational devices to conduct safe navigation and avoid collisions in various navigational areas, with particular attention to the exchange of information between ARPA, AIS, and ECDIS, while also considering the errors and limitations of ARPA systems	[SU6] demonstration of practical skills
[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 at an advanced level: - the principles of manual operation of navigational radars; - the principles of preparing radar plots; - the principles of operation of ARPA (Automatic Radar Plotting Aids) devices and their capabilities in collision avoidance maneuver planning	[SW5] implementation of a problem task

Subject contents

IMO Technical and Operational Requirements for Radar Equipment. Fundamental phenomena and challenges in radar navigation. Structure and operation of marine navigational radar. Interpretation of radar display. Errors and accuracy in radar measurements. Radar performance diagnostics and preliminary fault identification. Digital echo processing and its impact on radar imagery. Devices cooperating with navigational radar. Preparation of radar plotting radar report, planning and monitoring the effectiveness of collision avoidance maneuvers. Use of radar equipment for ship position determination and monitoring. Plotting aids: EPA and ATA principles of operation and applications. ARPA: principles of operation, key functions, and handling. Interpretation of ARPA-derived information. Testing, errors, and limitations of ARPA systems. Integration of ECDISAISARPA systems. Use of radar systems in accordance with COLREGs to prevent collisions and excessive close-quarter situations.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	51.0%	100.0%

Recommended reading

Basic literature	1. JANUSZEWSKI J., KON W., WIĘCKOWSKI J.: Praktyka radarowa na małych statkach. Tom I i II. Wydawnictwo Trademar, Gdynia 1997. 2. KON W.: Wykorzystanie radaru do zapobiegania zderzeniom. 1983. 3. WAWRUCH R.: Radar jako pomoc w zapobieganiu zderzeniom na morzu. 1994. 4. WRÓBEL F.: Vademecum oficera wachtowego. Trademar, Gdynia 1999.
Supplementary literature	1. BOLE A. G., DINELEY W. O.: Radar and ARPA Manual. 1998. 2. COCKCROFT A. N., LAMEIJER J.: Collision Avoidance Rulet (fifth edition). 2001.
eResources addresses	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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