GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Technology of Marine Control Systems, PG_00061843		
Field of study	Design and Construction of Yachts		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Zakład Energetyki i Automatyki Morskiej -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Mohammad Ghaemi	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	15.0	0.0	60

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	60	0.0	0.0	60

Subject objectives

The aim of the course is to familiarize students with the basic and most important technologies applied in the regulation, control and monitoring of ship systems, mainly applied for yachts.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W04] has knowledge in the field of computer science, electronics, electrical engineering, automation and control, information technology, computer graphics, useful for understanding the possibilities of their use in ocean engineering	The student has knowledge in the field of technology of automation and control systems of major marine systems, particularly applied in yachts, useful for analyzing their application in marine technology.	[SW1] Assessment of factual knowledge
[K6_U02] can work individually and in a team, communicate through various techniques in professional environment and also record, analyse, and present the results of work, can estimate the time needed to complete a given task	The student can communicate with professionals using various techniques (including simulation) used in the analysis and synthesis of the structure, elements and modules implemented in marine control systems (particularly in yachts) as well as document, analyze and present the results of his/her work related to the tasks performed in the field of the initial design of control systems of selected systems ships.	[SU1] Assessment of task fulfilment
[K6_K03] is aware of the impact of non-technical aspects on the engineer's work and the impact of engineering activities on the natural environment		

Subject contents	1. Introduction to yacht automation - ecological, social, economic and technical aspects 2. Overview of the process of designing the control system by taking into account the technological aspects - example 3. Measuring elements, sensors, transducers and transformers - types and classification, characteristics of measuring elements (including: sensors and transducers/transformers of position, angular velocity, load and force, pressure, temperature, flow, liquid level and sensors used in underwater technology). 4. Servomechanisms and actuators used in control systems - types and characteristics, including: servomechanisms and hydraulic and pneumatic actuators, as well as control valves. 5. Modeling, simulation and control of the yacht's propulsion system, including angular speed control, remote control of the propulsion system, control of multi-propeller and/or multi-engine propulsion systems 6. Logic and sequence control, including relays and switching, Boolean algebra, gate logic, ladder diagrams, logic components, programmable logic controllers and their programming. 7. Automatic control of the selected yacht's systems 8. SCADA, OPC, HMI, IoT, and communication standards and protocols 9. Safety and monitoring systems, alarms and signaling
Prerequisites and co-requisites	Theory of Marine Control Systems

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Project	51.0%	30.0%
Lecture	56.0%	45.0%
Tutorials	51.0%	25.0%

Recommended reading	Basic literature	1. Hugh J., Integration and Automation of Manufacturing Systems (Robots, PLC, CNC), 2001. 2. Shell R. L., Hall E. L., Handbook of Industrial Automation, ed., University of Cincinnati, Ohio, Marcel Dekker Inc., New York, 2000.
	Supplementary literature	1. Kank C., Diesel Motor Ships' Engines and Machinery, Institute of Marine Engineering, London, 1990.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	