GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Selected Problems of Small Craft Construction, PG_00061840		
Field of study	Design and Construction of Yachts		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
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	6.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Artur Karczewski	
	Teachers	dr inż. Artur Karczewski dr hab. inż. Tomasz Mikulski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	45.0	0.0	0.0	45.0	0.0	90

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	90	0.0	0.0	90

Subject objectives

The aim of the course is to familiarize students with the structure, operation, and principles of selection and design of rigging systems and sailing equipment used in the contemporary yacht industry. The course covers fundamental concepts related to rigging and sail plans, types and characteristics of sail propulsion systems, as well as materials employed in standing and running rigging, sails, and deck hardware.

The course further introduces the principles of geometric configuration of rigging systems and the methodologies applied in their design, including simplified approaches and general methods used in advanced load and structural strength analysis. The acquired knowledge enables students to properly select and design rigging components both at the conceptual design stage and during the practical implementation of yacht construction.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K02] can work in a team, assuming various roles, can act in a rational and ethical way	Skills of team work.	[SK5] Assessment of ability to solve problems that arise in practice
[K6_W02] has knowledge in the field of technical mechanics, fluid mechanics, strength of materials, necessary to understand the basic physical phenomena occurring in ocean engineering	Knowledge of engineering mechanics, strength of materials, and fluid mechanics.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U04] has skills that allow for self-education and preparation for work in an industrial environment, including the application of occupational health and safety rules	Skills enabling independent learning and preparation for work in an industrial environment, including the application of occupational health and safety regulations.	[SU1] Assessment of task fulfilment

Subject contents

Course content – lecture

1. Introduction to rigging and sail plans: fundamental terminology, functions, and classification of rigging components.
2. Sail propulsion systems: rig types, aerodynamic characteristics, and the influence of sail configuration on yacht performance.
3. Types of rigging systems and fundamentals of rig and sail geometry.
4. Sail types, sail geometry, and terminology used in sail design.
5. Materials used in standing and running rigging, sails, and deck hardware; properties of sail fibers and fabrics.
6. Sail design and manufacturing: design stages, production technologies, and the relationship between sail construction and performance.
7. Deck hardware and sail-handling systems: selection and design of components (blocks, winches, furlers/reefing systems) and types of ropes/lines, their construction, materials, and applications.
8. Rig design: geometric configuration and its relationship to sail geometry and load distribution.
9. Rig design using simplified methods.
10. Rig design using general methods: load analysis, strength calculations, and structural safety assessment.

Course content – project

1. Rig design using the simplified PRS method based on a sloop-rig yacht design provided in the project brief (PPO).
2. Rig configuration: design and specification of standing rigging.
3. Rig load calculations using the simplified method.
4. Rig load calculations using the general method.
5. Running rigging layout and deck plan arrangement for sail handling systems.
6. Technical documentation: sail plan and standing rigging plan.
7. Preparation of complete technical documentation for the rigging system.

Prerequisites and co-requisites

Knowledge in the fields of engineering mechanics, fluid mechanics, wind propulsion systems, and ship design.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lecture - test(s)	60.0%	50.0%
Project - report(s)	100.0%	50.0%

Recommended reading

Basic literature	Principles of Yacht Design, L. Larsson, R. Eliasson, M. Orych Rules for the Classification and Construction Sea-going Yachts, PRS
Supplementary literature	A Treatise on Ship-Building, F. Chapman
eResources addresses	

Example issues/ example questions/ tasks being completed	
Practical activites within the subject	Not applicable

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