GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Wind Propulsions, PG_00045106		
Field of study	Ocean Engineering, Ocean Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
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	English
Semester of study	6	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Theory and Ship Design -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Artur Karczewski	
	Teachers	dr inż. Artur Karczewski mgr inż. Hanna Pruszko	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	30.0	0.0	45

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	45	6.0	24.0	75

Subject objectives

Mastering the methods of designing sails propulsors.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and systems	The student formulates a design task regarding the design of a sail propulsion based on which he implements the final project	[SU5] Assessment of ability to present the results of task
[K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems	Student on structured knowledge of designing various types of sail propellers depending on the type of ship.	[SW3] Assessment of knowledge contained in written work and projects
[K6_W06] has an organized knowledge on engineering methods and design tools allowing the conducting of projects within the construction and operation of ocean technology objects and systems	The student has knowledge of the methods and design tools that enable the implementation of a sail propulsion project, taking into account its components such as course stability, cooperation of sails, geometry of sails.	[SW1] Assessment of factual knowledge
[K6_K03] understands non-technical aspects and effects of operation as an engineer, its influence on the environment and is aware of the responsibilities for the decisions taken	The student learns all aspects related to the execution of sails, including new technologies and the rules for their introduction.	[SK3] Assessment of ability to organize work

Subject contents

Lectute: The environment of the sails. Air and wind in nature. Type of sails arrangement. Creation of a forces on a sail propulsions. Theory of lifting plate - mathematical models (boundary vortex, free vortex, induced velocity, distribution of circulation and pleasure on sail plate). Influence of sails plane outline and slender on aero-dynamics characteristics. Measure of merit of aerodynamics efficiency of sail propulsions. Relation between lifting force and trust. Theory of thin sections. Cooperation of sails in stack and palisade configurations. Geometry of sail plate. VPP (Velocity and Stability Prediction Programs),VMG (velocity made good). Temporary technology and fabric in sails manufacture. Design: - sails plan of sailing yacht - sails balance - VPP ans SPP calculations - drawing - Rig and Sails Plane.

Prerequisites and co-requisites

The knowledge of mechanics, hydromechanics, ship theory, ship design.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>project</td><td>80.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Milewski Z.; Sailing Yacht Design , Gdynia, Milewski J. 1999 (in polish) 2. Larsson L.,Eliasson R.; Principles of Yacht Design, Adlard Cole Nautical 1994 3. Claughton, Wellicome, Shenoi; Sailing Yacht Design Theory, Longman ,Dorchester 1998 4. Machaj Cz. ; Sailing theory and Practice, London; Adlard Coles Nautical 1979</td></tr>
<tr><td>Supplementary literature</td><td>1. Durand W.F.; Aerodynamics Theory , vol.IV Ney York 1963 2. Abbott I.S., Doenhoff A.E.; Theory of wing sections, Dover Publication, NY 3. Hoerner S.F.; Fluid Dynamic Lift, Hoerner S.F- 1975 4. Hoerner S.F.; Fluid Dynamic Drag, Hoerner S.F- 1975</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
Napęd żaglowy - Moodle ID: 29469
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29469</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Theoretical models of the airfoil

Kutta-Zukowski equation.

The theory of thin profiles.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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