



## Subject card

Subject name and code	Non-metallic materials, PG_00058492						
Field of study	Ocean Engineering						
Date of commencement of studies	October 2022	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	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			4.0		
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 hab. inż. Lech Rowiński					
	Teachers	dr inż. Mohamed Behilil mgr inż. Piotr Bela dr inż. Karol Niklas dr hab. inż. Lech Rowiński					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	0.0	45
	E-learning hours included: 0.0						
Materiały niemetalowe Oceanotechnika 22/23 - Moodle ID: 26107 <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=26107">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=26107</a>							
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	0.0		0.0	45	
Subject objectives	Provide basic knowledge regarding organic synthetic materials (plastics) that are utilized in machine and boat building as well as principles of selection of materials for structures, glues and surface coats.						
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	Is able to define selection procedure of material for indicated mechanical element			[SU2] Assessment of ability to analyse information		
	[K6_W03] has a basic knowledge on hydromechanics, thermodynamics, machine construction, ecology, materials science and electronics necessary to understand the construction and operation principles of ocean technology objects and equipment	Is able to describe influence of material parameters of an mechanical element on properties of this element and propose means of procurement of such element			[SW1] Assessment of factual knowledge		
Subject contents	Basic definitions and nomenclature (monomers and polymers); Review of non-metallic materials - natural and synthetic (cellulose, proteins, natural caoutchouc); Material characteristics for different application areas; Thermoplastics and elastomers. Mechanical and thermal properties of thermoplastics. Duromers and their chemistry. Resins and reinforcements for marine application. Technological process of reinforced structures. Technological process of a large structural element of reinforced synthetic resin.						
Prerequisites and co-requisites	Basic chemistry. Basic mechanical properties of materials						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Short test during every lesson	60.0%			50.0%		
	Laboratory raport	80.0%			50.0%		

Recommended reading	Basic literature	<p>1. Dobrosz K., Matysiak A., Tworzywa sztuczne Warszawa WSZIP 1985</p> <p>2. Kłosowska-Wońkiewicz Z., Królikowski W., Penczek P., Żywice i laminaty poliestrowe. Warszawa WNT 1980</p> <p>3. Kozłowski J., Wilczopolski M., Materiałoznawstwo okrętowe czIII Okrętowe Tworzywa Polimerowe. Gdynia WSMW 1982</p> <p>4. Królikowski W., Tworzywa wzmocnione i włókna wzmacniające, Warszawa WNT 1988</p> <p>5. Żuchowska D., Polimery konstrukcyjne. Warszawa WNT 1995</p>
	Supplementary literature	<p>1. Błędzki A.K. i inni: Recykling materiałów polimerowych, Wydawnictwa Naukowo Techniczne, Warszawa, 1997.</p> <p>2. Composites World (<a href="https://www.compositesworld.com">https://www.compositesworld.com</a>)</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	