



Subject card

Subject name and code	Non-metallic materials, PG_00056414						
Field of study	Ocean Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2021/2022		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
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 hab. inż. Lech Rowiński				
			dr hab. inż. Leszek Matuszewski				
			mgr inż. Piotr Bela				
			dr inż. Tomasz Seramak				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	15.0	45
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: Materiały niemetalowe OCE WIMIO - Moodle ID: 18598 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18598						
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		10.0		45.0	100
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		Student is able to select plastic material for typical technical product basing on technical specification and technological properties		[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		The student knows principal plastics. The student knows basic data of synthetic materials. The student is able to describe the properties of synthetic materials; He knows basic technological processes He knows basic technological processes and its influence on the usable properties of synthetic materials, he distinguishes main composites categories. He knows the basic types resins and reinforcing materials used in boat building and reinforcing materials. Student knows the principles of procurement polymer/fiber composites		[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	1.Dobrosz K.,Matysiak A.,Tworzywa sztuczne Warszawa WSZiP 1985 2.Kłosowska-Wońkiewicz Z.,Królikowski W.,Penczek P..Żyvice i laminaty poliestrowe. Warszawa WNT 1980 3.Kozłowski J.,Wilczopolski M..Materiałoznawstwo okrętowe czIII Okrętowe Tworzywa Polimerowe. Gdynia WSMW 1982 4.Królikowski W., Tworzywa wzmocnione i włókna wzmacniające,Warszawa WNT 1988 5.Żuchowska D.,Polimery konstrukcyjne. Warszawa WNT 1995	
	Supplementary literature	1. Błędzki A.K. i inni: Recykling materiałów polimerowych, Wydawnictwa Naukowo Techniczne, Warszawa, 1997. 2. Composites World (https://www.compositesworld.com)	
	eResources addresses	Materiały niemetalowe OCE WIMIO - Moodle ID: 18598 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18598	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		