

## Subject card

	, PG_00056276							
Ocean Engineering								
October 2021		Academic year of realisation of subject			2021/2022			
first-cycle studies		Subject group			Obligatory subject group in the field of study			
				Subject group related to scientific research in the field of study				
Full-time studies		Mode of delivery			at the university			
1		Language of instruction			Polish no comments			
1		ECTS credits		3.0				
general academic profile		Assessment form			assessment			
Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology								
Subject supervisor	dr inż. Milena Supernak							
Teachers		dr inż. Paulina Strąkowska						
dr inż. Jacek Haras								
		mgr inż. Lech Nadolny						
		dr inż. Milena						
	1			1		1		
					t		SUM	
hours	15.0	0.0	0.0  30.0  0.0			0.0	45	
E-learning hours included: 0.0								
Adresy na platformie eNauczanie:								
Metaloznawstwo , PG_00056149, PG_00056276. PG_00056241 - Moodle ID: 16738 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16738								
Learning activity		Participation in		Self-study		SUM		
	classes includ	led in study	consultation hours					
Number of study hours	45		6.0		24.0		75	
Presentation of the field of technical knowledge which is materials science. To acquaint the student with the structure of metals and their alloys. Determination and study of the structure of metals. Examination of mechanical and physical properties of iron alloys and non-ferrous metal alloys, such as aluminum and								
Course outcome		Subject outcome			Method of verification			
[K6_W03] has a basic knowledge on hydromechanics, thermodynamics, machine construction, ecology, materials		The student analyzes the relationship between the production, structure, properties and functionality of the material			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation			
science and electronics necessary to understand the construction and operation principles of ocean technology objects and equipment					[SW3] Assessment of knowledge contained in written work and projects			
[K6_U05] can formula engineering task and specification within the design, construction	ate a simple I its ne range of and operation	Student defines the properties of materials. The student identifies the basic properties of metallic materials. The student identifies the types of research on the crystal structure: macroscopic and microscopic. Student defines phase and structural components of Fe-C alloys. Student defines iron alloys as well as aluminum			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools			
	Full-time studies  Full-time studies  Full-time studies  I  general academic pro Institute of Ocean Entechnology  Subject supervisor  Teachers  Lesson type  Number of study hours  E-learning hours incluided a study hours  E-learning hours incluided a study hours  Learning activity  Number of study hours  Presentation of the first structure of metals arm echanical and physicopper.  Course out  [K6_W03] has a basion hydromechanics, the modynamics, maconstruction, ecology science and electron to understand the rocing technology objects a specification within the design, construction of ocean technology  of ocean technology  Teachers	first-cycle studies  Full-time studies  1  1  general academic profile  Institute of Ocean Engineering and Stechnology  Subject supervisor  Teachers  Lesson type Lecture  Number of study hours  E-learning hours included: 0.0  Adresy na platformie eNauczanie:  Metaloznawstwo , PG_00056149, Phttps://enauczanie.pg.edu.pl/moodle  Learning activity Participation in classes including plan  Number of study hours  Presentation of the field of technical structure of metals and their alloys. Imechanical and physical properties copper.  Course outcome  [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  [K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and	October 2021    Realisation   Full-time studies   Subject grown	Academic year of realisation of subject	October 2021  Academic year of realisation of subject  first-cycle studies  Subject group  Full-time studies  Mode of delivery  Language of instruction  ECTS credits  general academic profile  Assessment form  Institute of Ocean Engineering and Ship Technology -> Faculty of Mechatechnology  Subject supervisor  Teachers  dr in2. Milena Supernak  dr in2. Jacek Haras mgr in2. Lech Nadolny dr in2. Milena Supernak  Lesson type  Lecture  Tutorial  Laboratory  Project  Number of study hours  E-learning hours included: 0.0  Adresy na platformie eNauczanie: Metaloznawstwo, PG_00056149, PG_00056276. PG_00056241 - Mochtps://enauczanie.pg.edu.pi/moodle/course/view.php?id=16738  Learning activity  Participation in didactic classes included in study plan  Number of study hours  Persentation of the field of technical knowledge which is materials science and electronics necessary to understand the construction and operation principles of ocean technology objects and equipment  [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  [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  [K6_W03] has a basic knowledge on hydromechanics, the student defines the properties of materials. The student identifies the basic properties of materials. The student identifies the properties of materials. The student identifies the properties of materials. The student identifies the pass of research on the crystal structure: macroscopic and microscopic. Student defines phase and structural components of Fe-C alloys. Student defines in on alloys as well as alluminum	October 2021  Academic year of realisation of subject  first-cycle studies  Subject group  Obligation of subject  Full-time studies  Mode of delivery  1 Language of instruction  1 ECTS credits  3.0  general academic profile  Assessment form  Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Entechnology  Subject supervisor  Teachers  dr in2. Milena Supernak  dr in2. Paulina Strąkowska  dr in2. Jacek Haras  mgr in2. Lech Nadolny  dr in2. Milena Supernak  Lesson type  Lesson type  Lecture  Number of study  hours  Learning hours included: 0.0  Adresy na platformie eNauczanie:  Metaloznawstwo, PG 00056149, PG 00056276, PG 00056241 - Moodle ID:  https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16738  Learning activity  Participation in didactic classes included in study plans  plans and study of the structure of metals and their alloys. Determination and study of the structure of metals and their alloys. Determination and study of the structure of metals and their alloys. Determination and study of the structure of metals and physical properties of iron alloys and non-ferrous metal alloys. Scopper.  Course outcome  [K6_W03] has a basic knowledge on hydromechanics, thermodynamics, machine construction, ecology, materials science and electronics necessary to understand the construction and operation of cocan technology objects and equipment [K6_W05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and equipment [K6_W05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and equipment [K6_W05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and engineering task and its specification within the range of design, construction and operation of cocan technology objects and engineering task and its use microscop	October 2021  Academic year of realisation of subject  Subject group  Deligatory subject field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Subject group relative research in the field of study Across the field of study Subject group relative research in the field of study Across group relative research in the field of study Subject group relative research in the field of study Across group relations and study of Mechanical Engineering and Technology Delan Subject group relative research in the field of study Across group relations and study of the structure of metals and their alloys. Determination and study of the structure of metals and their alloys. Determination and study of the structure of metals and their alloys. Determination and study of the structure of metals. Examine construction records and persition principles of ocean technology objects and equipment [KG_U05] can formulate a simple engineering task and its specification within the range of iron alloys and non-ferrous metal alloys, such as alumin or operation of research on the construction and operation of coean technology objects and equipment [KG_U05] can formulate a simple engineering task and its specification within the range of ocean technology objects and equipment [KG_U05] can formulate a simple engineering task and its specification within the range of coean dechnology objects and ex	

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Subject contents	Materials and their importance in technology. Characteristics of the main groups of materials. 2 Characteristics of solids. Structure of materials. Structure defects. 3 Construction of metal alloys. 4. Phase equilibrium systems. The iron-carbon system. 5. Iron-carbon alloys. 6. Heat treatment. Thermo-chemical treatment. 7. Alloy steels. 8. Standardization, classification and marking systems for steel and cast iron. 9. Copper and copper alloys. 10. Aluminium and aluminum alloys. 11. Bearing Alloys. 12. Degradation of metal materials						
Prerequisites and co-requisites							
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Credit for the laboratory - participation, tests and reports on the completed topics	60.0%	50.0%				
	Passing the content of the lecture - written form	60.0%	50.0%				
Recommended reading	Basic literature	<ul> <li>Głowacka M., Zieliński A.: Fundamentals of Materials Science. WPG, Gdańsk 2011</li> <li>Dobrzański L.A.: Fundamentals of materials science and metallurgy WNT, Warsaw, 2002.</li> </ul>					
	Supplementary literature	<ul> <li>Dobrzański L.A.: Metal engineering materials, WNT Warsaw 2004</li> <li>Dobrzański L.A.: Engineering materials and material design, WNT Warsaw 2006</li> </ul>					
	eResources addresses	Metaloznawstwo , PG_00056149, PG_00056276. PG_00056241 - Moodle ID: 16738 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=16738					
Example issues/ example questions/ tasks being completed	Macro and microscopic research2. Analysis of the structures of the iron-carbon system3. Tests of iron alloys (cast steel, cast iron, unalloyed steels)4. Alloy steels5. Research on copper and its alloys6. Tests of aluminum and aluminum alloys						
Work placement	Not applicable						

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