

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Computer Modeling of Materials I, PG_00039818							
Field of study	Materials Engineering, Materials Engineering, Materials Engineering							
Date of commencement of studies	October 2021		Academic year of realisation of subject		2023/2024			
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	3		Language of instruction			Polish polish		
Semester of study	6		ECTS credits		2.0			
Learning profile	general academic profile		Assessment form		assessment			
Conducting unit	Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics							
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marek Augustyniak					
	Teachers		dr inż. Marek Augustyniak					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0		0.0	30
	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	30		3.0		17.0		50
Subject objectives	The aim of the course is to provide the Student with the ability to perform engineering analyzes using Finite Element Methods. Currently, all branches of the industry use these methods, including production of vehicles and machinery, civil engineering, household, medicine, military). FEA is one of the "fast paths" leading from basic knowledge to applications, enabling the acquisition of analysts' job, and motivating the Student/Engineer to a deeper understanding of the physical basis of a given issue - whether it its nature is mechanical, thermal, electromagnetic, or flow-related.							

Learning outcomes	Course outcome	Subject outcome	Method of verification				
	K6_K01	The course participant understands the need to improve professional and personal competences; is aware of their own limitations and knows when to turn to experts, is able to properly define priorities for the implementation of tasks specified by themselves or others	[SK1] Assessment of group work skills				
	K6_W05	The student acquires knowledge in the field of mechanics, technology and electrical engineering, including engineering graphics and the use of computer- aided technology, the use of databases in the design of technological processes.	[SW3] Assessment of knowledge contained in written work and projects				
	K6_W06	The student will be able to demonstrate the techniques needed to develop engineering skills in the field of materials science	[SW2] Assessment of knowledge contained in presentation				
	K6_U04	Student skills include proficiency in information and communication techniques to effectively perform standard engineering tasks. Additionally, he uses known methods and mathematical and physical models to precisely describe and explain chemical phenomena and processes.	[SU3] Assessment of ability to use knowledge gained from the subject				
Subject contents	1. THE BOW (mechanics: composite, chord modelling, calculating the strength of the shot, correlation with						
	2. THE TOWING HOOK (mechanics: weight optimization without loss of load capacity)						
	3. THE O-RING (non-linear mechanics: constitutive equation of a hyperelastic material, contact issues)						
	4. THE TUNING FORK (modal vibrations + design in CAD)						
	5. THE YACHT (modal vibrations, harmonic oscillations, model amendments)						
	6. THE EGG (unsteady heat exchange - boiling of an egg)						
	7. THE WELD (coupling of mechanics and heat exchange, analysis in time - testing of post-weld distortions)						
	8. LATTICE MATERIAL (examination of typical LM structures, then own design, with focus on mechanical and thermal properties)						
	9. NDT (magnetic yoke on steel plate - a question of the distribution of magnetic, static and variable fields)						
	10. ELECTRICAL CIRCUITS (tuning the RLC resonant circuit and optimising the heating coil)						
Prerequisites and co-requisites	Willingness to obtain a job closely associated with the curriculum.						
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Classroom exercises	70.0%	100.0%				
Recommended reading	Basic literature None						
	Supplementary literature	None					
	eResources addresses	Adresy na platformie eNauczanie:					

Example issues/ example questions/ tasks being completed	 THE BOW (mechanics: composite, chord modelling, calculating the strength of the shot, correlation with the experiment) THE TOWING HOOK (mechanics: weight optimization without loss of load capacity)
	3. THE O-RING (non-linear mechanics: constitutive equation of a hyperelastic material, contact issues)
	4. THE TUNING FORK (modal vibrations + design in CAD)
	5. THE YACHT (modal vibrations, harmonic oscillations, model amendments)
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Work placement	Not applicable