



## Subject card

Subject name and code	3D prototyping , PG_00061570						
Field of study	Nanotechnology						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group 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	2	ECTS credits			6.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Magnetycznych Właściwości Materiałów -> Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Chmielewski					
	Teachers	dr inż. Marek Chmielewski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	30.0	0.0	75
	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	75		0.0		0.0	75
Subject objectives	The aim of the course is to familiarize the student with the possibilities of technical 3D prototyping from the level of using commercial and non-commercial software to create 3D models to the process of direct printing using 3D devices such as FDM/FFF and SLA.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_K04	The student is able to separate the phases from the project, which form a logical whole and give the possibility, after their completion, of the final realisation of the project. He/she is able to prepare partial reports of his/her activities in a synthetic manner and is able to defend the functionality of his/her product.	[SK3] Assessment of ability to organize work [SK4] Assessment of communication skills, including language correctness
	K7_W01	The student has the ability to analyse the properties of different materials used in 3D prototyping. Can effectively select the right material for a specific application. Is able to consider the physical and chemical properties of the material when directly producing models and functional designs.	[SW1] Assessment of factual knowledge
	K7_U07	The student learns about the possibilities of various design techniques, independently discovers and indicates the possibilities of their successful application in fields other than those realised during the laboratory. Independently creates functional 3D objects	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	K7_W06	Students will know the structure and operation of equipment used in study of materials, with particular emphasis on ultrasonic flaw detectors, measures the magnetic field, eddy currents meter, a device for measuring voltage pulses Barkhausen effect, magnetic recording systems dispersive device generation and detection of magnetostrictive pulses.	[SW1] Assessment of factual knowledge
K7_K03	Work in the laboratory in group consist with three students. Cooperation in order to achieve the intended results. Planning and allocation of functions and roles in the process of handling the measuring equipment and data acquisition	[SK1] Assessment of group work skills [SK2] Assessment of progress of work	
Subject contents	The content of the course is to comprehensively familiarise students with prototyping techniques based on 3D printing technologies. Within the scope of the subject, programmes for the rapid creation of simple and advanced 3D models will be presented. Work with commercial as well as free software is foreseen. The next task will be to familiarise students with 3D printing techniques, especially in terms of practical applications. The final stage of the course will be the realisation of a selected 3D project, from the level of the computer model to the final product.		
Prerequisites and co-requisites	not required		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	50.0%	100.0%
Recommended reading	Basic literature	web resources  <a href="https://3d.edu.pl/3-obowiazkowe-ksiazki-o-druku-3d/">https://3d.edu.pl/3-obowiazkowe-ksiazki-o-druku-3d/</a>	
	Supplementary literature	not require	
	eResources addresses	Adresy na platformie eNauczanie: Prototypowanie 3D - Moodle ID: 33970 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33970">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33970</a> Prototypowanie 3D - Moodle ID: 33970 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33970">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33970</a>	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		