



## Subject card

Subject name and code	, PG_00052093						
Field of study	Nanotechnology						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2024/2025		
Education level	first-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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Chmielewski					
	Teachers	dr inż. Mateusz Cieślak 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	15.0	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	2.0		18.0		50
Subject objectives	The purpose of the course is the practical application of 3D prototyping systems used for the practical solution of engineering problems and issues. Ability to work on modern FDM printing systems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_K04	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
	K6_U04	The student will learn additive manufacturing techniques, effectively use tools to create three-dimensional models. He/she is able to properly select the types of materials that can be effectively used for his/her project.	[SU4] Assessment of ability to use methods and tools
	K6_W07	The student will learn various research techniques used in the field of structure research, chemical composition, atomic structure, The student will learn and classify physical phenomena used in the field of materials research and nanotechnology	[SW1] Assessment of factual knowledge
	K6_U02	The student presents the seminar and critically analyze scientific works in the field of materials testing, carried out the review process and presenting it to the public before leading the group and other students. Publicly trying confirm and justify their conclusions.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
K6_W09	The student will learn the operation and construction of measuring equipment used in the field of testing the properties and structure of materials. The student will learn the capabilities of various measurement techniques, independently discover and indicate the possibilities of their effective application in fields other than those realized during the laboratory.	[SW1] Assessment of factual knowledge	
Subject contents	<p>Lecture :</p> <p>The content of the course is to comprehensively introduce or remind students of prototyping techniques based on 3D printing technologies. Within the scope of the subject, programs for rapid creation of simple and advanced 3D models will be presented. The possibilities of 3D prototyping in the laboratory provided for the realization of the subject will be presented and described. Learning how to configure and set parameters for 3D printing.</p> <p>Laboratory</p> <p>Based on the needs of the individual or indicated by the instructor, students will complete a project using 3D printing technology. For the purpose of the subject, it will be possible to apply reverse engineering techniques based on the use of 3D scanners.</p>		
Prerequisites and co-requisites	Not required		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	100	80.0%	100.0%
Recommended reading	Basic literature	<p>Druk 3D. Praktyczny przewodnik po sprzęcie, oprogramowaniu i usługach. <a href="#">Kloski Liza Wallach Kloski Nick Wydawnictwo Helion.</a></p> <p><a href="https://www.prusa3d.com/pl/strona/podstawy-druku-3d-z-josefem-prusa_490/">https://www.prusa3d.com/pl/strona/podstawy-druku-3d-z-josefem-prusa_490/</a></p> <p><a href="https://botland.com.pl/kursy-wideo/18296-kursy-modelowanie-3d-w-fusion-360-i-modelowanie-3d-pod-druk-3d-pakiet-wersja-on-line.html?cd=19686871092&amp;ad=&amp;kd=&amp;gad_source=1&amp;qclid=Cj0KCQiAy8K8BhCzNJPumeYPOORHN4vixKpNr-0r034aAvNPEALw_wcB">https://botland.com.pl/kursy-wideo/18296-kursy-modelowanie-3d-w-fusion-360-i-modelowanie-3d-pod-druk-3d-pakiet-wersja-on-line.html?cd=19686871092&amp;ad=&amp;kd=&amp;gad_source=1&amp;qclid=Cj0KCQiAy8K8BhCzNJPumeYPOORHN4vixKpNr-0r034aAvNPEALw_wcB</a></p>	
	Supplementary literature	Not required	

	eResources addresses	Adresy na platformie eNauczenie: Nowoczesne techniki wytwarzania elementów urządzeń technologicznych - Moodle ID: 45351 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=45351">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=45351</a>
Example issues/ example questions/ tasks being completed	3D scanner, extrapolation, texture creation 3D printing materials. FDM printing technique	
Work placement	Not applicable	

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