GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00056103		
Field of study	Mechanical and Medical Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	
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	Department of Manufacturing and Production Engineering -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Stefan Dzionk	
	Teachers		

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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	0.0	0.0	30

Subject objectives	To introduce students to modern methods of making components used in medical engineering, and methods of data acquisition for design and manufacturing.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W13] he/she has knowledge related to application of engineering approaches in medicine or application of medical devices and rehabilitation devices	The student knows the basic principles of equipment and tools design for the manufacture of components used in medical engineering.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_W04] he/she has skills in the field mechanical testing of materials used in engineering and mechanical-medical area	Students will be familiar with basic material processing technologies to produce parts that meet the quality requirements of components used in medical engineering.	[SW1] Assessment of factual knowledge
	[K6_W07] he/she is able to design, manufacture and utilize machine parts and technical devices, he/she can prepare a technical documentation	The student knows advanced methods of producing parts for medical engineering. The student presents methods of processing polymeric materials to produce parts for medical engineering.	[SW1] Assessment of factual knowledge
	[K6_U07] he/she is able to identify the problem and list simple engineering tasks to solve this problem in practice, he/she is able to critically analyze the proposed technical solutions and conclude whether these solutions can be implemented to solve problems related to design of mechanical devices and mechanical-medical devices	The student is able to design simple tools to manufacture parts used in medical engineering.	[SU1] Assessment of task fulfilment
	[K6_K01] he/she knows his/her proficiencies and his/her limitations in performing professional tasks, he/she is aware of needing to improve his/her skills through the whole life, he/she has entrepreneurship and innovation skills, he/she is aware of engineering skills from the society point of view	The student is able to obtain information from the professional literature in order to prepare simple tools for the manufacture of components used in medical engineering.	[SK5] Assessment of ability to solve problems that arise in practice
Subject contents	LECTURE Modelling and reconstruction methods, basic definitions, meaning of terms, application. Principles of method and techniques of rapid prototyping process and manufacturing.Reverse engineering, mapping methods the actual model in the virtual model. Data formats used in rapid prototyping techniques, data conversion and errors of conversion. CAD model creating bases of data from the magnetic resonance imaging and computed tomography. Fundamentals of polymer plastics processing. PROJECT: Development of technology and design documentation for a simple equipment to produce a specific component for medical engineering.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60.0%	50.0%
	Project	60.0%	50.0%
Recommended reading	Basic literature	1. Chlebus E.: Innowacyjne technologie Rapie Prototyping/ Rapie Tooling w rozwoju produktu, Oficyna Wydawnicz Politechniki Wrocławskiej, Wrocław 2003 2. Chlebus E.: Techniki komputerowe CAx w inżynierii produkcji, Warszawa WNT 2000, 3. A. Brent Strong: Plastic materials and processing, Pearson Education, INC. Upper Saddle River, New Jersey 2006. 4. Searching: Tworzywa sztuczne Poradnik, WNT warszawa 2000r. 5. Feld M.: Podstawy projektowania procesów technologicznych typowych części maszyn. WNT, Warszawa, 2003, 6. Feld M.: Uchwyty obróbkowe WNT warszawa 2002r.	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczanie:	

Example issues/ example questions/ tasks being completed	1. Describe what are the techniques of Rapid Prototyping (RP / RT) basic methods for creating prototypes. 2. Types of models and prototypes, replace and characterize. 3. The main phases of modelling using stereolithography. 4. The elimination of the problems of traditional methods of manufacturing. 5. Reverse engineering - the objectives and application. 6. List and describe the methods of digitization. 7. Methods of combining "point clouds" and verify the measurements for determining the area. 8. Characterize the method of recording data in the format *. stl. 9. List and describe the typical CAD model conversion errors * .stl format., The use of Euler's formula. 10. Deformation models performed using RP methods, describe the possible causes of their formation. 11. Method to characterize and define the scope of its application due to the accuracy and the materials used. 12. Describe of the plastic processing methods.
Work placement	Not applicable

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