



## Subject card

Subject name and code	Material technologies processing, PG_00057889						
Field of study	Mechanical and Medical Engineering						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		English		
Semester of study	3		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Technologii Maszyn i Automatyzacji Produkcji -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Artur Sitko				
	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 acquaint students with advanced manufacturing methods as well as to present English terminology functioning in manufacturing techniques.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U81] is able to communicate with ease in foreign language at B2+ level of the Common European Framework of Reference for Languages (CEFR) in everyday life, in academic and professional environments		The student knows basic terminology used in the field of manufacturing techniques. The student is able to consult in a foreign language when designing production tools.		[SU5] Assessment of ability to present the results of task		
	[K7_K81] is able to cooperate in international team at her/his own university, during work placement and during study abroad		The student, cooperating in a team, searches in foreign literature for information related to manufacturing techniques.		[SK2] Assessment of progress of work		
	[K7_W81] has knowledge of complex grammatical structures and diverse lexical resources needed to communicate in foreign language in terms of general and specialist language related to field of study		The student knows specialized terminology and can communicate in a foreign language.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_W03] He/she knows methods, techniques and tools applied to solve engineering problems in the scope of the field of study of mechanical-medical engineering		The student is familiar with advanced manufacturing methods used to produce components for medical devices. Students will be able to propose an appropriate production technique depending on the design requirements for medical devices components.		[SW1] Assessment of factual knowledge		
	[K7_U08] He/she can formulate and verify hypotheses for simple engineering problems and research		The student is able to prepare and elaborate a simple design task concerning the tools used in the manufacture of components for medical devices. The student applies CAD support systems to verify structural assumptions of designed devices.		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		

Subject contents	Lecture: Introduction, general characteristic of advanced machining process. High-speed cutting/high-speed machining, high-speed dry machining, hard machining. Precision and ultra-precision machining. Processing of polymer plastics, punching with embossing. Chemical machining (CM), chemical milling, chemical blanking. Electrochemical machining (ECM), electrochemical grinding (ECG), electrical-discharge machining (EDM), Wire EDM. Laser beam machining (LBM), Electron-beam machining, surface machining. Water-jet machining (WJM), Abrasive water-jet machining (AWJM), Abrasive-flow machining. Micromachining.  Project: Development and preparation of documentation for tools used in the manufacture of medical device components. Including: assumptions, structural and technological requirements for the designed tool, preliminary concept, concept verification supported by CAx methods, structural design of the tool.		
Prerequisites and co-requisites	Technology of medical product (PG_00055740)		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Design of a technological device or tool	60.0%	50.0%
Recommended reading	Basic literature	1. Katapian S. Manufacturing Engineering and Technology Pearson Education Inc. Upper Saddle River, New Jersey 2006. 2. Oczko k. E.: Kształtowanie materiałów skoncentrowanymi strumieniami energii. Wyd. Pol. Rzeszowskiej, Rzeszów 1988. 3. Schmid D.: Mechatronika. Rea, Warszawa 2002. 4. Zaborski St.: Obróbka elektrochemiczno-ścierna podstawy i zastosowania, Politechnika Wrocławska 2007. 5. Beer P. Niekonwencjonalne narzędzia do obróbki drewna, nóż ultradźwiękowy, promień świetlny, struga wody, Wydawnictwo Akademii Rolniczej, Poznań 2007	
	Supplementary literature	Articles in academic journals	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	1. Characterize polishing in magnetic field, 2. Describe the performance capabilities and parameters of the EDM process, 3. Vibro-abrasive machining and its applications, 4. Disadvantages and advantages of WEDM machining, 5. Abrasive blast cutting technology and machining capabilities.		
Work placement	Not applicable		