



Subject card

Subject name and code	Manufacturing Techniques 1, PG_00042029						
Field of study	Power Engineering, Power Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2021/2022		
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	1	Language of instruction			English		
Semester of study	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Stefan Dzionk					
	Teachers	dr hab. inż. Stefan Dzionk dr inż. Daniel Chuchała					
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	5.0		40.0	75	
Subject objectives	Presentation basic methods of the manufacturing systems, including: the mechanics of the cutting phenomena, cutting parameters, types of materials for cutting edge, design and use of tools and machine tools for turning, drilling, milling and grinding.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	The student is able to propose the appropriate production methods depending on the manufactured element. The student is able to choose the basic tools used in a given method as well as the necessary equipment.			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W05] has structured knowledge in the field of electrical engineering and electronics, necessary to understand the basics of operation and selection of electrical machines, electricity transmission systems and power electronic devices	The student has structured knowledge of the basic methods of manufacturing mechanical components. The student knows the possibilities of making individual design features of a component using the appropriate machining method and determine the basic parameters of this machining.			[SW1] Assessment of factual knowledge		

Subject contents	<p>LECTURE Basic concepts of machining. Classification of machining. Elements of the workpiece and tools. Kinematics of machining. General design of machines. Basics of the material removal processes. Physical basics of the cutting process. The geometry of the removed layer. Forces, torques and power of cutting. Geometrical and technological parameters of machining. Heat and cutting temperature. Cooling and greasing substances. Design of cutting tools. Geometry of the cutting edges in cutting tools. Modern tools materials. Consumption and durability of cutting tools. Machinability of materials. Selection principles for tools and cutting parameters. Turning. Purpose and variety of rolling. Construction and kinematics of a universal lathe. Conventional turning. Mounting tools and machined objects on the lathe. Basic lathe operations. Milling. Purpose and variety of milling. Millings conditions. Construction of vertical and horizontal milling. Millings equipment. Examples of work carried out by milling. Boring. Construction and kinematics of drills. Construction and purpose of tools for drilling, reaming and countersinking. Grinding. Materials used for abrasive tools. Characteristics of abrasive tools used for the processing of flat surfaces, shafts and holes. Examples of grinding operations.</p> <p>LABORATORY EXERCISES: 1. Lathe manufacturing system: machine tools, tools and their selection, process parameters and machining possibilities. 2. Milling manufacturing system: machine tools, tools and their selection, parameters of the process and machining possibilities, construction, operation of the dividing head. 3. Work shop metrology, tools and measurement methods. 4. Finishing: machining methods, machine tools, tools and their selection, process parameters and machining possibilities. 5. Basics of computer aided in preparation of turning processes. 6. Basics of computer aided in preparation of milling process technology. 7. Gear machining: technologies, parameters, use of dividers head.</p>											
Prerequisites and co-requisites	Basics of technical drawings											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 732 794 763">Subject passing criteria</th> <th data-bbox="799 732 1141 763">Passing threshold</th> <th data-bbox="1145 732 1490 763">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 770 794 801">Assessment of laboratory</td> <td data-bbox="799 770 1141 801">60.0%</td> <td data-bbox="1145 770 1490 801">50.0%</td> </tr> <tr> <td data-bbox="453 808 794 840">Final test</td> <td data-bbox="799 808 1141 840">60.0%</td> <td data-bbox="1145 808 1490 840">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Assessment of laboratory	60.0%	50.0%	Final test	60.0%	50.0%
	Subject passing criteria	Passing threshold	Percentage of the final grade									
	Assessment of laboratory	60.0%	50.0%									
Final test	60.0%	50.0%										
Assessment of laboratory	60.0%	50.0%										
Final test	60.0%	50.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Kalpakjian S., Schmid S.: Manufacturing Engineering and Technology. Prentice Hall; 7 edition (April 11, 2013). 2. Cichosz P.: Narzędzia skrawające. WNT, Warszawa 2006. 3. Olszak W.: Obróbka skrawaniem. WNT, Warszawa 2008. 										
	Supplementary literature	Thematic articles from databases of the GUT Library										
	eResources addresses											
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Built-up edge in the cutting zone. 2. Cemented carbide as a tool material . 3. Design of a universal lathe. 4. Technology of precise hole H7. 											
Work placement	Not applicable											