



## Subject card

Subject name and code		Manufacturing Engineering, PG_00040059						
Field of study		Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies		October 2020	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		Part-time studies	Mode of delivery			at the university		
Year of study		2	Language of instruction			Polish		
Semester of study		4	ECTS credits			4.0		
Learning profile		general academic profile	Assessment form			exam		
Conducting unit		Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)		Subject supervisor		dr inż. Piotr Sender				
		Teachers		dr inż. Piotr Sender dr inż. Dawid Zieliński dr hab. inż. Mariusz Deja				
Lesson types and methods of instruction		Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
		Number of study hours	15.0	0.0	8.0	8.0	0.0	31
		E-learning hours included: 0.0						
		Technologia maszyn (M:31921W0) - Wykłady i projekty - semestr letni 2022 - Moodle ID: 24070 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=24070">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=24070</a>						
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	31	4.0		65.0		100
Subject objectives		The ability to select technological processes for the production of typical machine components. Design for manufacturing.						
Learning outcomes		Course outcome		Subject outcome		Method of verification		
		[K6_U04] is able to perform a critical analysis of the existing technical solutions, present the specification of the technology of manufacturing basic construction elements of machines and engineering assemblies		Choosing the right technology for construction elements		[SU2] Assessment of ability to analyse information		
		[K6_U08] is able to design a technological manufacturing process for typical elements of machines or devices, using analytical and numerical calculating tools		The use of calculators for selecting technological parameters		[SU4] Assessment of ability to use methods and tools		
		[K6_W11] possesses knowledge on design, technology and manufacturing of machine parts, metrology, and quality control; knows and understands methods of measuring and calculating basic values describing the operation of mechanical systems, knows basic calculating methods applied to analyse the results of experiments		Process planning for typical mechanical components.		[SW3] Assessment of knowledge contained in written work and projects		
		[K6_U09] is able to plan the manufacturing, assembly and quality control processes of typical constructions and mechanical devices, estimating their costs		Process analysis taking into account labor consumption and manufacturing costs		[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	LECTURE The production process and its components. Data for the technological design process, documentation and technical time standard. Selection of machining allowances. Design of semi-finished products. Technological construction. Machining bases and rules for determining objects on machine tools and machining accuracy. Technological methods of shaping the surface layer of machine parts and their influence on operational properties. Technological processes of typical machine parts for various types and degrees of automation of machining and assembly. Process typification. Group processing. Flexible manufacturing systems. Computer-aided manufacturing. Programming of numerically controlled machine tools and robots. LABORATORY Determining the technical standard of time. Influence of machining bases and the way of setting the lathe on errors in machining the shaft. Technological analysis of shafts finishing by burnishing and grinding. Influence of hole processing technology on the accuracy of spacing their axes. Helical gear technology. Analysis of the assembly of machine components. Basics of programming and machining on CNC machine tools. PROJECT Designs of technological processes for typical machine parts: e.g. shaft and lever. Preparation of documentation, selection of: allowances, instrumentation, tools, technological parameters, determination of the technical standard of time.		
Prerequisites and co-requisites	Engineering drawing, manufacturing processes		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	60.0%	30.0%
	Laboratory reports and tests	80.0%	35.0%
	Projects	80.0%	35.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Feld M.: Podstawy projektowania procesów technologicznych typowych części maszyn. WNT, Warszawa, 2013.</li> <li>2. Gawlik E. i inni: Projektowanie procesów technologicznych obróbki skrawaniem. Wydawnictwa AGH, Kraków 2019.</li> <li>3. Poradnik inżyniera. Obróbka skrawaniem. T. I-III. WNT, Warszawa, 1993.</li> <li>4. Przybyłski i inni: Technologia maszyn i automatyzacja produkcji. Laboratorium. Wyd. PG, Gdańsk, 2001.</li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Olszak W.: Obróbka skrawaniem. WNT, Warszawa, 2008. Cichosz P.:</li> <li>2. Piotr Cichosz. Narzędzia skrawające. WNT, Warszawa, 2006.</li> <li>3. Sobolewski i in.: Projektowanie technologii maszyn. Oficyna Wydawnicza Politechniki Warszawskiej. Warszawa 2007.</li> </ol>	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Selected manufacturing processes for a given part with specific design and technological requirements.</li> <li>2. Basic rules for selecting technological parameters for milling operations.</li> <li>3. Basic rules for selecting technological parameters for turning operations.</li> <li>4. The structure of a grinding wheel.</li> <li>5. Influence of the manufacturing technique on the properties of the surface layer.</li> </ol>		
Work placement	Not applicable		