



Subject card

Subject name and code	Manufacturing Engineering, PG_00050290						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2022/2023		
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	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		6.0		
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. Bogdan Ścibiorski				
	Teachers		dr inż. Sławomir Szymański prof. dr hab. inż. Adam Barylski dr inż. Bogdan Ścibiorski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	15.0	0.0	60
	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	60		6.0		84.0	150
Subject objectives	The student learns the technology of machines.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U08] is able to design a technological manufacturing process for typical elements of machines or devices, using analytical and numerical calculating tools	Student can prepare technological documentation for the produced typical parts of machines of the shaft and lever class, using the knowledge of the subject.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [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	Analyzes technological operations in terms of: execution time, accuracy, machining parameters, machining allowances, measurements in machine technology.	[SW1] Assessment of factual knowledge [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	Describes the principles of designing operations and technological processes of typical machine parts, taking into account the cost manufacturing.	[SU3] Assessment of ability to use knowledge gained from the subject
	[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	Student can determine the technological requirements. Selects the structure of the technological process. Designs the basic technological processes of typical parts machines. Analyzes the technological efficiency of the structure.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
Subject contents	<p>LECTURE The production process and its components. Data for the technological design process, documentation and technical time standard. Selection of machining allowances. Designing semi-finished products. Technologicality of construction. Machining bases and rules for determining items on machine tools and machining accuracy. Technological methods of shaping the surface layer of machine parts and their impact on operational properties. Technological processes of typical machine parts for various types and the degree of automation of machining and assembly. Process typification. Group processing. Flexible systems manufacturing. Computer-aided manufacturing. Programming of controlled machine tools numerically and robots. LABORATORY Determining the technical standard of time. The influence of machining bases and the method of adjusting the lathe to errors in machining the shaft. Technological analysis of finishing rollers by burnishing and grinding. Influence of hole machining technology on the accuracy of their spacing axis. Helical gear technology. Analysis of the assembly of machine components. The basics programming and machining on CNC machine tools. PROJECT Designs of typical technological processes machine parts: shaft and lever. Preparation of documentation, selection of: allowances, instrumentation, tools, technological parameters, determination of the technical standard of time.</p>		
Prerequisites and co-requisites	Knowledge of chipless machining, machining and machine tools as well as metrology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	60.0%	20.0%
	Laboratory	90.0%	20.0%
	Lecture. Exam (written)	60.0%	60.0%
Recommended reading	Basic literature	1. Feld M.: Projektowanie i automatyzacja procesów technologicznych. PWN W-wa 2018. 2. Przybylski W., Deja M.: Komputerowo wspomaganie wytwarzania maszyn. WNT, W-wa 2007. 3. Przybylski i in.: Technologia maszyn i automatyzacja produkcji. Laboratorium. Politechnika Gdańska, Gdańsk 2001. 4. Cichosz P.: Narzędzia skrawające. WNT, W-wa 2006	
	Supplementary literature	1. Obróbka skrawaniem Poradnik inżyniera 1-3, Wydawnictwa Naukowo Techniczne WNT 2. Olszak W.: Obróbka skrawaniem. WNT, Warszawa, 2008	
	eResources addresses	Adresy na platformie eNauczanie: Technologia maszyn, W/L/P, MiBM, sem. 05, zimowy, 22/23, (PG_00050290) - Moodle ID: 24024 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=24024	

Example issues/ example questions/ tasks being completed	<p>Process design as a basic element of engineering activities. The production process and its components. Data for the technological design process, documentation and technical standard time. Selection of machining allowances, design of semi-finished products, construction technology. Bases machining and rules for determining objects on machine tools and machining accuracy. Technological ways of constituting 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 typing, group processing and flexible manufacturing systems. Computer manufacturing support, programming of numerical machine tools. Setting a technical standard work time. Influence of machining bases and the method of setting the lathe on errors in machining the shaft.</p> <p>Analysis</p> <p>technological process of finishing rollers by burnishing and grinding. Application industrial robot in technological processes. Basics of programming and machining on machine tools CNC (lathe and milling machine). Influence of hole technology on the accuracy of spacing their axes.</p> <p>Process designs</p> <p>typical machine parts, e.g. shaft, lever, gear wheel. Preparation of documentation, selection of allowances, instrumentation, tools, technological parameters of processing, technical standard of working time</p>
Work placement	Not applicable