

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Efficiency and quality of machining processes, PG_00064727								
Field of study	Management and Production Engineering								
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027				
Education level	second-cycle studies		Subject group			Specialty subject group 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			Polish			
Semester of study	2		ECTS credits		4.0				
Learning profile	general academic profile		Assessment form		exam				
Conducting unit	Division of Manufacturing and Production Engineering -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Wydziały Politechniki Gdańskiej								
Name and surname	Subject supervisor		dr hab. inż. Daniel Chuchała						
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	t	Seminar	SUM	
	Number of study hours	15.0	0.0	15.0	15.0		0.0	45	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in stud plan		Participation in consultation hours		Self-study		SUM	
	Number of study hours	45		14.0		41.0		100	
Subject objectives	The aim of the course inmanufacturing proc theirinfluence on the theimplementation of	e is to get acqu esses. Learn a quality and effic processes on i	ainted with iss bout the const ciency of proce machine tools.	ues of process ruction and app esses. Methods	modelin blication and me	g and c of varic eans of	operation of cous tool syste selection and	eutting tools ems and analysis of	

Learning outcomes	Course outcome	Subject outcome	Method of verification			
	[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study	The student is able to obtain information on the cutting tools, cutting parameters of machining processes using web and mobile tools.	[SW1] Assessment of factual knowledge			
	[K7_W04] demonstrates knowledge covering selected issues in the field of advanced detailed knowledge, in particular in the field of methods, techniques, tools and algorithms used in production management and control processes as well as in the design of technological processes	The student is able to use mathematical models to determine the energy properties of the cutting process and the parameters of the chip formation process in the cutting process.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects			
	[K7_K12] is ready for fullfiling social commitement and initation of actions for public interest including entrepreneurial thinking and acting	The student is able to identify environmental risks and select appropriate process conditions to reduce them.	[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice			
	[K7_U04] creatively designs or modifies, in whole or at least in part, production and technological systems and processes, in accordance with the given specifications, taking into account technical and non-technical aspects, estimating costs and using known design techniques appropriate for tasks in the field of Management and Production Engineering	Students will be able to design a manufacturing process based on the energy requirements of the manufacturing process.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools			
Subject contents						
	LECTURE:General characteristics and classification of materials for cutting edges of tools withdefinedcuttingedge. Causes of wear, geometrical factors of wear, physical and technological bluntnessfactors of ablade.Wear in time (tool life, wear of cutting tool blades in interrupted machining). Principles ofbladematerialselection. Tool loading - energy properties of machining process. Cutting forces - methods offorceestimationbased on model taking into account specific cutting resistance and elements of modernfracturemechanics(Atkins's model). Models for determining shear angle in cutting zone. Tooling systemoverview(ISO, HSK,CAPTO, etc.). Principles of tool and insert selection. Methods of measuring cuttingedge wear.Vibrations incutting process. Dynamic stiffness of tools with low inherent stiffness. Economicefficiency andoptimization ofmachining process.LABORATORY: Geometry of cutting edge. Construction ofmodern cutting tools. Study of influence ofcuttingedge geometry on surface roughness in turning. Wear andtear of cutting edges. Computer aidedselectionof cutting tools. Static stiffness. Determination of criticalspeeds of tools with low inherent stiffness.Tool costanalysis.PROJECT:Prediction of energy conditions for a selected machining process.					
Prerequisites and co-requisites	Basic knowledge of machining, mach	hine tools and cutting tools and man	ufacturing techniques			
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade			
and criteria	Project exercises	100.0%	10.0%			
	Final exam	56.0%	80.0%			
	Laboratory exercises	100.0%	10.0%			
Recommended reading	mmended reading Basic literature		<ol> <li>Grzesik W.: Advanced machining processes of metallic materials.Theory, modelling and applications. Elsevier, 2017.</li> <li>Cichosz P.: Narzędzia skrawające. WNT, 2006.</li> </ol>			

	Supplementary literature			
		<ol> <li>Markopoulos A.P.: Finite element method in machining processes. Springer, London, 2013.</li> <li>Training handbook. Metal cutting technology. C-2920:40 en-GB © AB Sandvik Coromant 2017.11</li> </ol>		
	eResources addresses			
Example issues/ example questions/ tasks being completed	List and describe measures of tool cutting edge wear according to PN-ISO standard. The effect of cutting parameters on cutting edge life.			
Work placement	Not applicable			

Document generated electronically. Does not require a seal or signature.