

。 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced measuring systems and Geometric Product Specification, PG_00064717							
Field of study	Management and Production Engineering							
Date of commencement of studies	February 2026		Academic year of realisation of subject			2025/2026		
Education level	second-cycle studies		Subject group			Obligatory subject group in the field of study Subject group related to scientific		
Marda - Catada	Full time studios					research in the field of study		
Mode of study			Mode of delivery					
Year of study			Language of instruction			Polish		
Semester of study	1		ECTS credits			4.0		
Learning profile	general academic profile		Assessment form			assessment		
Conducting unit	Institute of Manufactu Technology -> Wydzi	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Wydziały Politechniki Gdańskiej						1 Ship
Name and surname	Subject supervisor		dr inż. Aleksandra Mirowska					
of lecturer (lecturers)	Teachers							
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
	hours	30.0	15.0	15.0	0.0		0.0	00
	E-learning hours inclu	ided: 0.0	•					•
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic led in study	Participation i consultation h	n nours	Self-study		SUM
	Number of study hours	60		8.0		32.0		100
Subject objectives	To familiarize students with advanced measurement methods based on CMM, confocal microscopy, interferometric microscopy and other measurement methods. The course also aims to familiarize students with the proper specification of product geometries							
Learning outcomes	Course out	Subject outcome			Method of verification			
	[K7_U02] formulates and tests hypotheses related to problems occurring in stationary and non- stationary systems as well as in production and technological processes combined with simple research problems		The student has an expanded knowledge of advanced measurement systems. The student has an expanded knowledge of geometric surface structure parameters and their interpretation.			[SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_W01] explains and describes, on the basis of general knowledge in the field of scientific disciplines creating the theoretical basis for Management and Production Engineering, the structure and principles of operation of production systems and processes and their elements, as well as methods and means of their integration and control		Designing the quality control process for complex mechanical components, interpreting the results of geometric measurements in terms of the applied manufacturing technology of machine parts.			[SW3] Assessment of knowledge contained in written work and projects		
	[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving		The student acquires knowledge from the literature on measurement and its accuracy. The student verifies the methods of measurement depending on the properties of the object being measured and the expected uncertainty of the measurement.			[SK5] Assessment of ability to solve problems that arise in practice		
	[K/_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		and journal databases related to modern solutions used in metrology.			knowledge		

Subject contents	The importance of coordinate measuring machines, the basics of CMMs and their parameters, measuring systems, measuring heads and ways to determine their accuracy, non-contact measuring heads, measuring procedures and standard computer software, Production measuring machines, accuracy of measuring machines and ways to determine them, coordinate measuring arms, industrial computed tomography, confocal microscopy, interferometric microscopy. Geometric model, shape tolerances, bases, base elements and representations of base elements, ways of determining measurement bases, tolerances of direction, position, shape of determined outline or shape of determined surface with or without base, spatial description of surface roughness. Measurement of various geometric features by means of coordinate measuring technique, planning of measurements by techniques determination of geometric structure of the surface by means of confocal and interferometric techniques. Functional selection, determination and interpretation of geometric tolerances. Tolerances of selected complex geometric elements. Dimensional chains - analysis and synthesis. Application of coordinate measuring machines to control dimensional and geometric deviations. Differences between EN-ISO standards and other standards.						
Prerequisites and co-requisites	Fundamentals of metrology, technical drawing, manufacturing techniques						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria		60.0%	30.0%				
		60.0%	30.0%				
		60.0%	40.0%				
Recommended reading	Basic literature	 cyfikacje Geometrii Wyrobów (GPS): 3. (2015). Odchyłki kształtu i niaru. Stal, Metale & Nowe Słrzędnościowe systemy pomiarowe, Warszawskiej, Warszawa 2016. 2014). Metrologia w budowie maszyn: nictwa NaukowoTechniczne. 					
	Supplementary literature	Selected journals available online in the databases of the Gdansk University of Technology on modern metrology, such as: 1. Measurement - https://www.sciencedirect.com/journal/ measurement 2. Metrology - https://www.mdpi.com/journal/metrology					
Example issues/ example questions/ tasks being completed	1. Present the general concept of external and internal dimension.2. For the presented mechanical component, determine the shape and position tolerances.3. Select the part manufacturing technology for the assumed dimension and shape tolerances.4. Based on the measurement data from the coordinate measuring machine, predict the possible technologies used to make the part.5. Characterize the parameters used in the spatial description of surface roughness.						
Work placement	Not applicable						

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