



Subject card

Subject name and code	, PG_00059043						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject				2024/2025	
Education level	first-cycle studies	Subject group				Obligatory subject group 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				5.0	
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						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	45.0	0.0	0.0	75
	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	75		5.0		45.0	125
Subject objectives	Recognition with the basic principles of metrology and preparing to conduct measurements of mechanical sizes with the analysis of the results. Rules for determining the accuracy, tolerance and fits of machine parts. Knowledge of the methods of measurement and measuring instruments.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_K01	The student conducts measurements in the team. The student is able to analyze the results of measurements carried out by the team.			[SK1] Assessment of group work skills		
	K6_W06	The student knows the basics of measuring mechanical quantities. The student assesses the compliance of the dimension with the specification.			[SW1] Assessment of factual knowledge		
	K6_U02	The student uses basic measuring instruments. The student correctly evaluates the measurement result, taking into account measurement errors.			[SU5] Assessment of ability to present the results of task		
	K6_W04	The student knows the principles of operation of measuring equipment. The student develops the measurement methodology according to the equipment used.			[SW3] Assessment of knowledge contained in written work and projects		
	K6_U01	The student correctly selects measuring devices for the range of measurements results. The student evaluates the measurement uncertainty of the device used.			[SU4] Assessment of ability to use methods and tools		

Subject contents	<p>Basic concepts in metrology: measurement, units of measurement, standards and instruments. Accuracy and uncertainty. The geometrical structure of the product (Geometrical Product Specifications - GPS). Basics of tolerances, deviations and fits. Geometric tolerances. General Tolerances - Tolerances for linear and angular dimensions without individual tolerance indications. Fundamentals of measurements (repeatability and reproducibility of a measuring device). Surface texture. Metrological methods and equipment and principles of its selection. Laboratory: Measurements of external, internal, mixed and intermediate dimensions. Measurement of angles, cones, . Measurements of surface texture and contours. Measurements with the use of altimeters. 2D measurements. Coordinate measuring technique (manual and CNC measuring machines). Tutorials: Measurements and their uncertainty (Measurement errors, uncertainty, uncertainty budget and statistical analysis of measurement results). Tolerances and fits. Dimensional chains. Tolerance of component dimensions, interchangeability. Thread tolerance.</p>														
Prerequisites and co-requisites	Basic knowledge of technical drawing														
Assessment methods and criteria	<table border="1" data-bbox="448 613 1487 752"> <thead> <tr> <th data-bbox="448 613 794 651">Subject passing criteria</th> <th data-bbox="794 613 1141 651">Passing threshold</th> <th data-bbox="1141 613 1487 651">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 651 794 685">Laboratory</td> <td data-bbox="794 651 1141 685">60.0%</td> <td data-bbox="1141 651 1487 685">30.0%</td> </tr> <tr> <td data-bbox="448 685 794 719">Tutorial</td> <td data-bbox="794 685 1141 719">60.0%</td> <td data-bbox="1141 685 1487 719">20.0%</td> </tr> <tr> <td data-bbox="448 719 794 752">Written exam</td> <td data-bbox="794 719 1141 752">60.0%</td> <td data-bbox="1141 719 1487 752">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory	60.0%	30.0%	Tutorial	60.0%	20.0%	Written exam	60.0%	50.0%
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Laboratory	60.0%	30.0%													
Tutorial	60.0%	20.0%													
Written exam	60.0%	50.0%													
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. W. Jakubiec, J. Malinowski: Metrologia wielkości geometrycznych. WNT, Warszawa 2018. 2. S. Białas, Z. Humienny, K. Kiszka: Metrologia z podstawami specyfikacji geometrii wyrobów (GPS). Oficyna wydawnicza PW, Warszawa 2014. 3. S. Adamczak, W. Makiela: Metrologia w budowie maszyn. WNT, Warszawa 2021 4. T. Sałaciński: Ćwiczenia laboratoryjne z metrologii. Oficyna wydawnicza PW, Warszawa 2015. 5. T. Sałaciński: Elementy metrologii wielkości geometrycznych. Przykłady i zadania. Oficyna wydawnicza PW, Warszawa 2013. 													
	Supplementary literature	<ol style="list-style-type: none"> 1. E. Ratajczyk: Współrzędnościowa technika pomiarowa. OWPW, Warszawa 20052. J. Jezierski: Analiza tolerancji i niedokładności pomiarów w budowie maszyn. WNT Warszawa 20033. A. Boryczko: Podstawy pomiarów wielkości mechanicznych. Wydawnictwo PG, Gdańsk 20104. A. Meller, P. Grudowski: Laboratorium metrologii warsztatowej i inżynierii jakości. http://www.wbss.pg.gda.pl ,podręczniki (format PDF) 													
	eResources addresses	Adresy na platformie eNauczanie:													
Example issues/ example questions/ tasks being completed	Types of fit machine parts and their uses? Classification of measurement errors? Presentation of measurement methods.														
Work placement	Not applicable														

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