



## Subject card

Subject name and code	Metrology and Measurement Systems, PG_00040171						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject				2020/2021	
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	1	Language of instruction				English	
Semester of study	2	ECTS credits				4.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Department of Manufacturing and Production Engineering -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Aleksandra Wiśniewska					
	Teachers	dr inż. Aleksandra Wiśniewska mgr inż. Karolina Miętka					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	15.0	0.0	0.0	45
	E-learning hours included: 0.0						
	Metrology and Measurement Systems - Moodle ID: 10188 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=10188">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=10188</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	45	7.0		48.0	100	
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_W11	Student recognizes mechanical quantities subject to measurement. Determine measurement methods and systems.			[SW1] Assessment of factual knowledge		
	K6_U05	Student explains construction and principle of operation of measurement instruments. Student chooses suitable measuring instrument for measure given quantity. Student measures. Student analyses results of measurements. Student calculates measuring errors.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
Subject contents	Basic elements of metrology. Methods, errors and uncertainty of measurements. Tolerance and fit of lengths and angles. Methods of geometrical chains analysis. Principles of interchangeability of machine parts. Accuracy of workpiece in machining. Elements of geometrical product specifications, tolerances of form, directions and position. Characteristic of surface geometrical workpiece structure. Principles of geometrical fit. Measure standards and instruments of measurement. Coordinate measuring machine and measurement systems. Automation of measurements.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Lecture	50.0%			40.0%		
	Exercises	50.0%			30.0%		
	Laboratory	50.0%			30.0%		

Recommended reading	Basic literature	1. W. Jakubiec, J. Malinowski: Metrologia wielkości geometrycznych. WNT, Warszawa 2004 2. S. Białas: Metrologia techniczna z podstawami tolerowania wielkości geometrycznych dla mechaników. Oficyna wydawnicza PW, Warszawa 2006 3. Pr. zb. pod red. Z. Humienny: Specyfikacje geometryczne wyrobów. WNT, Warszawa 2004 4. S. Adamczak, W. Makiela: Metrologia w budowie maszyn. WNT, Warszawa 2004 5. P. Paczyński: Metrologia techniczna. Przewodnik do wykładów, ćwiczeń i laboratoriów. Wyd. PP, Poznań 2003
	Supplementary literature	1. E. Ratajczyk: Współrzędnościowa technika pomiarowa. OWPW, Warszawa 2005 2. J. Jezierski: Analiza tolerancji i niedokładności pomiarów w budowie maszyn. WNT Warszawa 2003 3. A. Boryczko: Podstawy pomiarów wielkości mechanicznych. Wydawnictwo PG, Gdańsk 2010 4. A. Meller, P. Grudowski: Laboratorium metrologii warsztatowej i inżynierii jakości. <a href="http://www.wbss.pg.gda.pl">http://www.wbss.pg.gda.pl</a> , podręczniki (format PDF)
	eResources addresses	
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	