



Subject card

Subject name and code	Metrology, PG_00039942						
Field of study	Management and Production Engineering, Management and Production 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			Polish		
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 hab. inż. Adam Boryczko					
	Teachers	dr hab. inż. Adam Boryczko 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	30.0	0.0	0.0	60
	E-learning hours included: 0.0 Adresy na platformie eNauczanie: Metrologia - W/L/C, ZiIP, sem.02 (M:31810W0) - Moodle ID: 13448 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13448						
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	7.0		33.0	100	
Subject objectives	Students introduce measurement methods, determine instruments and measurement systems, make measurement, analyses results, determine error and uncertainty of measurements and evaluate measured workpiece.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_K03	evaluate and validate measured workpiece			[SK1] Assessment of group work skills [SK4] Assessment of communication skills, including language correctness		
	K6_U10	make measurement, analyses results			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	K6_W07	determine error and uncertainty of measurements			[SW1] Assessment of factual knowledge		
	K6_U05	evaluate measured workpiece			[SU1] Assessment of task fulfilment		
K6_W12	introduce measurement methods, determine instruments and measurement systems			[SW1] Assessment of factual knowledge			
Subject contents	Importance of measurement in machining. 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, arms measure and measurement systems. Automation of measurements. Non-contact laser measurement and reverse engineering.						

Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture - examination	50.0%	50.0%
	Tutorial	50.0%	25.0%
	Laboratory	100.0%	25.0%
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. Jeziński: 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. http://www.wbss.pg.gda.pl , podręczniki (format PDF) 5. E. Meller, J. Preihs: Ćwiczenia z analizy tolerancji. http://www.wbss.pg.gda.pl , podręczniki (format PDF)	
	eResources addresses	Metrologia - W/L/C, ZiIP, sem.02 (M:31810W0) - Moodle ID: 13448 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13448	
Example issues/ example questions/ tasks being completed	Dimensional analysis of the mechanism. Types of hole and shaft fits. Methods and measuring instruments.		
Work placement	Not applicable		