



Subject card

Subject name and code	Metrology, PG_00060634						
Field of study	Transport and Logistics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
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			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Wyposażenia Okrętu -> Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Kazimierz Czapczyk					
	Teachers	dr inż. Joanna Grzelak dr inż. Kazimierz Czapczyk dr inż. Jacek Nakielski					
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						
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		5.0		25.0	75
Subject objectives	Getting acquainted with the basic principles of metrology and preparation for measuring mechanical quantities with the analysis of the results.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U03] is able to use computer methods to support the design, development and operation of transport means and systems		[K6_U05] is able to plan an experiment in the field of measuring basic operating parameters of mechanical devices using specialized equipment, interpret the results and draw appropriate conclusions.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	[K6_W06] has established knowledge of engineering methods and design tools enabling the implementation of projects in the field of construction and operation of transport means and systems		[K6_W11] has knowledge in the field of design, technology and production of machine parts, metrology and quality control, knows and understands methods of measurement and calculation of basic quantities describing the operation of mechanical systems, knows basic computational methods used to analyze experimental results.		[SW1] Assessment of factual knowledge		
Subject contents	Basic concepts of metrology. Methods, errors and uncertainty of measurements. Tolerance and fits of lengths and angles. Methods of dimensional analysis. Principles of interchangeability of machine parts. The accuracy of the workmanship of the items. Elements of product geometry specification, tolerance of shape, direction and position. Characteristics of the geometrical structure of the surface of objects. Principles of geometric tolerance. Standards and measuring instruments. Coordinate measuring machine and measuring systems. Automation of measurements.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	100.0%	50.0%
	Lecture	60.0%	50.0%
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. http://www.wbss.pg.gda.pl , podręczniki (format PDF).	
	eResources addresses	Adresy na platformie eNauczanie: Metrologia - laboratorium (IBO, TiL) - Moodle ID: 37753 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37753 Metrologia - laboratorium (IBO, TiL) - Moodle ID: 37753 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37753	
Example issues/ example questions/ tasks being completed	Dimensional analysis of the mechanisms. Types of shaft and hole fits. Methods and measuring instruments.		
Work placement	Not applicable		