GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Technical and computer metrology, PG_00055745		
Field of study	Mechanical and Medical Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
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	5.0
Learning profile	general academic profile	Assessment form	exam
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	dr inż. Aleksandra Laska dr inż. Jacek Haras dr inż. Michał Dobrzyński mgr inż. Anna Janeczek dr inż. Grzegorz Gajowiec dr hab. inż. Stefan Dzionk dr inż. Aleksandra Wiśniewska	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	30.0	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	6.0	44.0	125

Subject objectives	Recognition with the basic principles of metrology and preparing to conduct measurements ofmechanicalsizes with the analysis of the results. Rules for determining the accuracy, tolerate and fits ofmachine parts.Knowledge of the methods of measurement and measuring instruments.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K02] he/she is aware of importance of professional dealing and to fulfill ethics obligations, he/she understands other (non-technical) abilities of mechanical engineering professional, their influence on the society and security of environment, he/she is aware of importance of social cooperation	Student explains construction and principle of operation of measurement instruments. Student chooses suitable measuring instrument for measure given quantity. Student measures.	[SK2] Assessment of progress of work [SK1] Assessment of group work skills [SK5] Assessment of ability to solve problems that arise in practice
[K6_W12] he/she has basic knowledge in the field of fundamental medical sciences, human body anatomy, and physiology, salvage service	Student recognizes mechanical quantities subject to measurement. Determine measurement methods and systems. The student has knowledge of methods, errors and measurement uncertainty, Geometrical Product Specifications (GPS) and assessment of their accuracy.	[SW1] Assessment of factual knowledge
[K6_U10] he/she is able to assess the human body physic and basic functioning of the body organs, he/she is able to use basic medical knowledge to solve mechanical-medical problems in the scope of the MME study	The student selects the appropriate measuring instrument to measure a given quantity measured with the use of CNC measuring systems. The student conducts simulation analyzes, prepares a measurement program in a computer environment, and takes measurements. The student analyzes the results of the measurements. Student calculates measurement errors.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information

Subject contents

Basic concepts in metrology: measurement, units of measurement, standards and instruments. Accuracyand uncertainty. The geometrical structure of the product (Geometrical Product Specifications - GPS).Basics of tolerances, deviations and fits. Geometric tolerances. General Tolerances - Tolerances for linearand angular dimensions without individual tolerance indications. Fundamentals of measurements(repeatability and reproducibility of a measuring device). Surface texture. Metrological methods andequipment and principles of its selection.Laboratory: Measurements of external, internal, mixed andintermediate dimensions. Measurement of angles, cones,. Measurements of surface texture and contours.Measurements with the use of altimeters. 2D measurements. Coordinate measuring technique (manual andCNC 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.

Prerequisites and co-requisites

Basic knowledge of technical drawing

Assessment methods and criteria

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%

Recommended reading

Basic literature	1. W. Jakubiec, J. Malinowski: Metrologia wielkości geometrycznych.WNT, Warszawa 2018.2. S. Białas, Z. Humienny, K. Kiszka: Metrologia z podstawamispecyfikacji geometrii wyrobów (GPS). Oficyna wydawnicza PW,Warszawa 2014.3. S. Adamczak, W. Makieła: Metrologia w budowie maszyn. WNT,Warszawa 20214. T. Sałaciński: Ćwiczenia laboratoryjne z metrologii. Oficynawydawnicza PW, Warszawa 2015.5. T. Sałaciński: Elementy metrologii wielkości geometrycznych.Przykłady i zadania. Oficyna wydawnicza PW, Warszawa 2013.
Supplementary literature	1. E. Ratajczyk: Współrzędnościowa technika pomiarowa. OWPW,Warszawa 20052. J. Jezierski: Analiza tolerancji i niedokładnościpomiarów w budowie maszyn. WNT Warszawa 20033. A. Boryczko:Podstawy pomiarów wielkości mechanicznych. Wydawnictwo PG,Gdańsk 20104. A. Meller, P. Grudowski: Laboratorium metrologiiwarsztatowej i inżynierii jakości. http:// www.wbss.pg.gda.pl ,podręczniki(format PDF)
eResources addresses	Adresy na platformie eNauczanie: Metrologia warsztatowa i komputerowa, W, L, C, IMM, sem.02, letni 2022/2023 - Moodle ID: 28778 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28778

Example issues/ example questions/ tasks being completed

Types of fit machine parts and their uses? Classification of measurement errors? Presentationofmeasurement methods.

Work placement

Not applicable