POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Workshop Metrology

Course

Field of study	Year/Semester
Transport	2/3
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	Polish
Form of study	Requirements
part-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
9	9	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:	Responsible for the course/lecturer:
dr inż. Lidia Marciniak - Podsadna	
email: lidia.marciniak-podsadna@put.poznan.pl	

Wydział Inżynierii Materiałowej

Prerequisites

1. Knowledge: knowledge of mathematical analysis and statistics, technical drawing and machine parts

2. Skills: logical thinking, using information obtained from the library and the Internet

3. Social competences: understands the needs of learning and acquiring new knowledge

Course objective

Learning the basic concepts of measurement techniques. Getting to know the measuring instruments and methods used in machine construction. Acquiring the ability to calculate and select the tolerance and fit symbol for holes, shafts and threads. Acquiring knowledge about measurement methods, error calculation and calculation of uncertainty of direct and indirect measurement.

Course-related learning outcomes

Knowledge

The student has ordered and theoretically founded general knowledge in the field of key issues of

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technology and detailed knowledge in the field of selected issues in this discipline of transport engineering

The student has knowledge of important development trends and the most important technical achievements and of other related scientific disciplines, in particular transport engineering

Skills

The student is able to properly plan and conduct perform experiments, including measurements and computer simulations, interpret the obtained results, and correctly draw conclusions

Social competences

The student understands that in technology, knowledge and skills very quickly become obsolete

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: Final test

Laboratory: Credit based on an oral or written answer regarding the content of each laboratory exercise and a written report. To obtain a credit, all exercises must be passed.

Programme content

Lecture: Measurement theory, measurement and its essence, measurement result, methods, types and means of measurement, SI units, meter definition, length and angle standards, gauge blocks, angle blocks, bevels, standards hierarchy, measurement errors, definition and classification, systematic, random and gross errors, error estimation and elimination of outliers, estimation of measurement uncertainty, statistical analysis of measurement results, measuring tools - classification, measurement methods, direct and indirect methods, errors in indirect methods, caliper devices, micrometer devices, indicators, microscopes, projectors, engineering tolerances and fits, statistical quality control, geometrical surface structure, form, location and run-out tolerances, surface roughness measurements, basics of coordinate measurement.

Laboratory :
1. Indirect Measurements.
2. Statistical analysis of measurement results.
3. Inside and outside measurements.
4. Measurement of threads.
5. Measurement of gears.
6. Measurement of form deviations.

Teaching methods

During the lecture, the theory is supported by examples. The lecture is conducted in an interactive way, questions towards students relate to general technical knowledge.

Bibliography

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Basic

1. Jakubiec W., Malinowski J.: Metrologia wielkości geometrycznych. WNT, Warszawa, 2018

2. Białas S. Humienny Z, Kiszka K.: Metrologia z podstawami specyfikacji geometrii wyrobu (GPS), Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2014

3. Paczyński P.: Metrologia Techniczna. Przewodnik do wykładów, ćwiczeń i laboratoriów, wyd. Politechniki Poznańskiej, Poznań 2003

4. Humienny Z. i inni: Specyfikacje geometrii wyrobów (GPS), Wydawnictwa Naukowo-Techniczne, Warszawa, 2004.

5. Adamczak S, Makieła W., Metrologia w budowie maszyn, WNT, Warszawa, 2010

Additional

1. Piotrowski J., Podstawy metrologii, PWN, Warszawa, 1979

2. Sydenham P.H., Podręcznik metrologii, t1, Wyd. KiŁ, Warszawa, 1988

3. Arendarski J. Niepewność pomiarów, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2003

4. Hagel R., Zakrzewski J., Miernictwo dynamiczne, WNT, Warszawa, 1984.

5. Ratajczyk E., Woźniak A., Współrzędnościowe systemy pomiarowe, Wydawnictwo Politechniki Warszawskiej, 2016

6. Tomasik J., Arendarski J., Gliwa – Gliwiński J., Jabłoński Z., Ratajczyk E., Żebrowska – Łucyk S., Sprawdzanie przyrządów do pomiaru długości i kąta, OWPW, 2009

Breakdown of average student's workload

	Hours	ECTS
Total workload	73	3,0
Classes requiring direct contact with the teacher	18	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	55	2

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[1] delete or add other activities as appropriate