# 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		
Measurements of mechanical quant	tities	
Course		
Field of study		Year/Semester
Aerospace Engineering		3/6
Area of study (specialization)		Profile of study
Aircraft engines and airframes		general academic
Level of study		Course offered in
First-cycle studies		polish
Form of study		Requirements
full-time		elective
Number of hours		
Lecture	Laboratory classes	Other (e.g. online)
15	15	0
Tutorials	Projects/seminars	
0	0	
Number of credit points		
2		
Lecturers		
Responsible for the course/lecturer		Responsible for the course/lecturer:
PhD Karolina Perz		
email: karolina.perz@put.poznan.pl		
tel.: 61 6652391		
Institute of Working Machines and I Vehicles	Motor	
ul. Piotrowo 3, 60-965 Poznań		
Prerequisites		
Has basic knowledge of physics, me	chanics and strength	n of materials.

#### **Course objective**

Understanding the methods of measuring mechanical quantities.

#### **Course-related learning outcomes**

#### Knowledge

has basic knowledge of measurement methods, characteristics of measuring instruments and their classification according to purpose, principles of operation and features, knows sensors and measuring transducers, registration of results, measurement systems, measurement errors - the influence of

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external factors, statistical analysis of measurement results, principles of organization of an active experiment and passive ], has basic knowledge in the field of strength of materials, including the basics of the theory of elasticity and plasticity, strain hypotheses, methods of calculating beams, membranes, shafts, joints and other simple structural elements, as well as methods of testing material strength and the state of deformation and stress in constructions , has basic knowledge in the field of technical diagnostics as well as methods and methods of solving problems of assessment of their technical condition and forecasting, knows: conditions for diagnosing technical objects, the essence of technical diagnostics and aviation engineering, tasks and goals of technical diagnostics

#### Skills

knows how to use a language to the extent that it is possible to understand technical texts in the field of aviation (knowledge of technical terminology), is able to obtain information from literature, the Internet, databases and other sources. Is able to integrate obtained information, interpret and draw conclusions from them ], is able to analyze objects and technical solutions, is able to search in the catalogs and manufacturers' websites ready components of machines and devices, including means of transport and storage, assess their suitability for use in own technical and organizational projects

#### Social competences

Is aware of the importance of maintaining the principles of professional ethics ], understands the need for a critical assessment of knowledge and continuous learning , is able to inspire and organize the learning process of others

#### Methods for verifying learning outcomes and assessment criteria

#### Learning outcomes presented above are verified as follows:

Credit based on the test of mastering the knowledge of lectures and ongoing control of preparation for laboratory exercises and assessment of their course and report.

#### **Programme content**

Scientific knowledge. Methodology of empirical research. Tests of machines and devices at the stages of construction, manufacture and operation. Metrological concepts: size, property, property, value. Measurement; definitions, unit systems. General principles of measuring methods of mechanical quantities. Measurement of stress, force, torque and rotational speed. Construction of the measuring system. Measurement system: sensor, transducer, meter, recorder. Computer software for conducting: analysis of recording and archiving measurements. Analysis of errors, preparation of results and formulation of conclusions from measurements.

PART - 66 (PRACTICE - 11.25 hours)

MODULE 7A. MAINTENANCE ACTIVITIES

7.2 Workshop Activities

Using tools, caring for tools, using workshop materials;

Sizes, clearances and tolerances, workmanship quality standards;



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Calibration of tools and equipment, calibration standards. [3]

#### **Teaching methods**

Lecture: multimedia presentation, illustrated with examples given on a board,

Laboratory exercises: performance of tasks given by the teacher - practical exercises.

#### Bibliography

Basic

1. Hagel R., Zakrzewski J.: Miernictwo dynamiczne, WNT Warszawa 1984

2. Nawrocki W.: Komputerowe systemy pomiarowe, WKŁ Warszawa 2002

#### Additional

3. Piotrowski J.: Podstawy miernictwa, WNT Warszawa 2002

#### Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2
Classes requiring direct contact with the teacher	35	1,5
Student's own work (literature studies, preparation for	15	0,5
laboratory classes/tutorials, preparation for tests/exam, project		
preparation) <sup>1</sup>		

<sup>&</sup>lt;sup>1</sup> delete or add other activities as appropriate