



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Measurements of mechanical quantities

### Course

Field of study

Construction and Exploitation of Means of Transport

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

9

Laboratory classes

9

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr inż. Tomasz Rochatka

Responsible for the course/lecturer:

Faculty of Civil and Transport Engineering

### Prerequisites

Has basic knowledge of physics, mechanics and strength of materials

### Course objective

Learning the methods of measuring mechanical quantities

### Course-related learning outcomes

Knowledge

Has knowledge of the methods of measuring mechanical quantities, stress, force, torque and rotational speed. He knows the construction of measurement systems and computer software for the analysis, recording and archiving of measurement results.

Skills

Can take measurements; static and dynamic deformation of machine elements by means of strain gauge, torque and variable speed methods with the use of a computer digital recorder. He knows how to develop measurement results, determine their error, formulate and prepare a report.



### Social competences

Is able to cooperate in a group of students during the implementation of laboratory exercises and preparation of a report.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Credit based on the test of knowledge of the lectures and the current control of preparation for laboratory exercises and assessment of their course and reports.

### Programme content

Scientific knowledge. Methodology of empirical research. Tests of machines and devices at the stages of construction, manufacturing and operation. Metrological concepts: quantity, property, property, value. Measurement; definitions, systems of units. General principles of measurement methods for mechanical quantities. Measurement of stress, force, torque and rotational speed. Construction of a measuring system. Measurement system: sensor, transducer, meter, recorder. Computer software for carrying out: analysis, recording and archiving of measurements. Error analysis, preparation of results and formulation of conclusions from measurements

### Teaching methods

1. Lecture with multimedia presentation
2. Laboratory with taking measurements

### Bibliography

Basic

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

Nawrocki W.: Komputerowe systemy pomiarowe, WKŁ Warszawa 2002

Piotrowski J.: Podstawy miernictwa, WNT Warszawa 2002

Additional

### Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	25	1,0

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