



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Measurements of mechanical quantities

### Course

Field of study

Mechanical and Automotive Engineering

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 in the field of physics, including the basics of classical mechanics, optics, electricity and magnetism, solid state physics, quantum and nuclear physics, necessary to understand specialist lectures in the field of the theory of construction materials and materials science, theory of machines and mechanisms, theory of electric drives and mechatronic systems.

Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge about the construction, construction methods, manufacturing and operation of a selected group of working, transport, thermal and flow machines covered by the diploma path.



Has elementary knowledge of the impact of machinery and technology on the natural environment and global energy balances.

#### Skills

Can properly use modern equipment for measuring major physical quantities, used in machine research and production control.

Can interact with other people as part of teamwork (also of an interdisciplinary nature).

Has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books.

#### Social competences

Is ready to critically assess his knowledge and received content

Is ready to fulfill social obligations and co-organize activities for the benefit of the social environment.

Is willing to think and act in an entrepreneurial manner.

#### 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	50	2,0
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) <sup>1</sup>	32	1,0

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