



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Experimental methods of testing vehicles [S2MiBP1-PSz>EMBP]

### Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

1/2

Area of study (specialization)

Railway Vehicles

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

dr hab. inż. Grzegorz Szymański prof. PP  
grzegorz.m.szymanski@put.poznan.pl

### Lecturers

### Prerequisites

The student has a basic knowledge of the techniques of measuring mechanical quantities and basic knowledge of modeling. The student is able to solve specific problems arising in technical systems. The student is able to work in a group, taking different roles in it. The student is able to determine the priorities important in solving the tasks set before him.

### Course objective

Learning methods and acquiring practical skills in solving tasks in the field of vehicle research rail.

### Course-related learning outcomes

Knowledge:

Has extended knowledge of physics in the field of contemporary physical problems conditioning the progress in technical sciences: solid state physics nonlinear optics, nuclear physics and new research methods used in physics.

Has a general knowledge of the types of research and methods of testing working machines with the use of modern measurement techniques and data acquisition.

Is aware of the civilization effects of technology.

### Skills:

Can formulate and test hypotheses related to simple research problems.

Can plan and carry out experimental research of specific processes taking place in machines and routine tests of a working machine or a vehicle from a selected group of machines.

Is able to carry out basic measurements of mechanical quantities on the tested working machine with the use of modern measuring systems.

### Social competences:

He is ready to critically assess his knowledge and received content.

Is willing to think and act in an entrepreneurial manner.

Is ready to fulfill professional roles responsibly, taking into account changing social needs, including:

- developing the professional achievements,
- maintaining the ethos of the profession,
- observing and developing the rules of professional ethics and acting towards the observance of these rules.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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The knowledge acquired during the lecture is verified by a 45-minute test carried out on the 7th lecture.

Kolokwim consists of questions (test and open-ended) with different scores. Threshold pass: 50% of points.

### Programme content

Methodology of experimental research. Methods of planning scientific experiments. Methodology of measurement of mechanical quantities.

### Course topics

Methodology of experimental research. Planning an experiment in the study of vehicle dynamics carried out under normal operating conditions. Fundamentals of measurements of mechanical quantities.

Analog-to-digital conversion. Structured "data-flow" programming in the environment LabView®.

Multidimensional analysis of data from the experiment.

### Teaching methods

1. Lecture: multimedia presentation, illustrated with examples given on the board. 2. Laboratory exercises: multimedia presentation illustrated with examples given on the blackboard and performing the tasks given by the teacher - practical exercises.

### Bibliography

#### Basic

1. Marven C., Ewers G., Zarys cyfrowego przetwarzania sygnałów. WKŁ, Warszawa 1996.

2. Tłaczała W., Środowisko LabView w eksperymencie wspomaganym komputerowo. WNT, Warszawa 2002.

#### Additional

[www.ni.com](http://www.ni.com)

[www.wobit.com.pl](http://www.wobit.com.pl)

[www.kistler.com](http://www.kistler.com)

[www.bksv.com](http://www.bksv.com)

[www.endevco.com](http://www.endevco.com)

[www.skf.com](http://www.skf.com).

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00