Physics laboratory I - Mechanics, thermodynamics - course description

General information

Course name	Physics laboratory I - Mechanics, thermodynamics
Course ID	13.2-WF-FizP-PL-I-MT-S17
Faculty	Faculty of Physics and Astronomy
Field of study	Physics
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2017/2018

Course information

Semester	2
ECTS credits to win	4
Course type	obligatory
Teaching language	english
Author of syllabus	• dr Lidia Najder-Kozdrowska

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Laboratory	45	3	-	-	Credit with grade

Aim of the course

The skill of planning and analysis of physical measurements.

Prerequisites

Foundations of mathematics and physics in the field of thermodynamics, the ability to analyze and visualize data, the ability to determine the measurement uncertainty

Scope

1. The determination of shear modulus. 2. The checking of equation of rigid body circular motion. 3. The determination of density of solids and liquids by way of pycnometer. 4. The determination of dynamic viscosity for liquids. 5. The determination of gravitational acceleration by way of Kater's pendulum. 6. The study of Lissajous curves. 7. The Quinke interferometer. 8. The determination of ratio cp / cv by way of Clement – Desormes. 9. The determination of specific heat for luquid by way of cooling.10. Determination of the speed of sound. 11. The investigation of the damped oscillations. 12. The investigation of the resonance phenomena in forced vibrations. 13. The investigation of the Joule's law.

Teaching methods

Laboratory method.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Student understands and can explain physical phenomena using the language of mathematics, is able to reproduce the theorems and physics laws themselves		• an ongoing monitoring during classes	• Laboratory
Student has general knowledge of basic physics and physical measurement methodology, which allows to understand basic physical phenomena		• an ongoing monitoring during classes	• Laboratory
Student can discuss about physical problems in plain language		• an ongoing monitoring during classes	• Laboratory
Student is aware of the responsibility for his / her own work and the readiness to comply with the rules of team work and responsibility for joint tasks		• a discussion	• Laboratory
Student can perform analyzes of theoretical and experimental results and formulate on this base appropriate conclusions.		• carrying out laboratory reports	• Laboratory
Student is aware of his or her knowledge and skills, understands the need and knows the possibilities of continuing education (second and third degree studies, postgraduate studies) - raising professional and personal competences		• a discussion	• Laboratory
Student knows the basic aspects of the construction and operation of the equipment and apparatus used in physics, is able to measure the physical quantity and to interpret it.		• an ongoing monitoring during classes	• Laboratory

Outcome description	Outcome symbols	Methods of verification	The class form
Student uses a physical measurement methodology, can plan and perform simple physical measurements, analyze measurement data, interpret and present measurement results.		• an ongoing monitoring during classes • carrying out laboratory reports	• Laboratory
Student is aware of the role of a graduate in physics, and in particular understands the need to formulate and communicate to the public information and opinions about the achievements of physics, and makes efforts to communicate such information and opinions in a universally understandable manner.		• a discussion	• Laboratory
Student knows the basic principles of occupational health and safety, recognizes hazards and selects appropriate measures to prevent them		• an ongoing monitoring during classes	• Laboratory
Student is able to develop a problem that illustrate physical topic and propose methods of its solving		• an ongoing monitoring during classes • carrying out laboratory reports	• Laboratory
Student understands the need to improve professional and personal competencies; It uses different sources of information to broaden and deepen his/her knowledge		• a discussion	• Laboratory

Assignment conditions

A semester credit is credited to the instructor's designated number of exercises.

The final assessment of the exercise consists of:
- assessment from preparation for laboratory classes 30%
- evaluation of laboratory work 20%
- evaluation of laboratory reports 50%

Recommended reading

[1] H. Szydłowski, Pracownia fizyczna wspomagana komputerem, Wydawnictwo Naukowe PWN, Warszawa 2003.
[2] H. Szydłowski, Pracownia fizyczna, Wydawnictwo Naukowe PWN, Warszawa 1994.
[3] T. Dryński, Ćwiczenia laboratoryjne z fizyki, Państwowe Wydawnictwa Naukowe, Warszawa 1978.
[4] R. Resnick, D. Halliday, Fizyka, Wydanie piętnaste, Wydawnictwo Naukowe PWN, Warszawa 2001.
[5] D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, Wydawnictwo Naukowe PWN, Warszawa 2003.

Further reading

[1] H. Szydłowski, Wstęp do pracowni fizycznej, Wydawnictwo Naukowe UAM, Poznań 1996.
[2] H. Szydłowski, Niepewności w pomiarach. Międzynarodowe standardy w praktyce, Wydawnictwo Naukowe UAM, Poznań 2001.

Notes

Modified by dr hab. Maria Przybylska, prof. UZ (last modification: 24-11-2017 23:15)