Physics laboratory - course description

General information

Course name	Physics laboratory
Course ID	13.2-WF-FizP-PL-S17
Faculty	Faculty of Physics and Astronomy
Field of study	Physics
Education profile	academic
Level of studies	First-cycle studies leading to Bachelor's degree
Beginning semester	winter term 2018/2019

Course information

Semester	5
ECTS credits to win	5
Course type	obligatory
Teaching language	english
Author of syllabus	

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	60	4	-	-	Credit with grade

Aim of the course

The basic aim of the course is to acquaint students with the phenomena of classical physics in practice and introduce them into the basics of experimental physics and metrology. The additional aim of the course is also to develop students' ability to plan and conduct physical measurements and to analyse obtained results.

Prerequisites

Knowledge of mechanics, thermodynamics, electricity and optics in the framework of the basic physics course. Ability to determine uncertainty of measurements.

Scope

The following laboratory works are conducted during the classes:

Determination of gravitational acceleration using a reversing pendulum.

Determination of shear modulus by dynamic method.

Determination of Cp/Cv ratio for air by the Clement-Desormes method.

Determination of density of liquids and solids using a pycnometer.

The Quinke's interferometer.

Determination of charge and capacitance of the capacitor.

Measuring of electrical resistance, checking of the Ohm's law.

Study of DC circuit (checking of the I and II Kirchoff's laws).

Study of electromagnetic resonance.

Study of ferromagnetic hysteresis loop.

Determination of lens focal length using the lens equation and the Bessel method.

Determination of diffraction grating constant by a laser.

Teaching methods

Laboratory method

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form

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The student understands and can explain the phenomena and processes in physical sciences; can create a theoretical model of the phenomenon and associate it with the results of measurements.		• an ongoing monitoring during classes • carrying out laboratory reports	• Laboratory
The student knows the basic aspects of construction and principles of operation of research equipment and devices used in physical sciences; can measure and interpret physical quantities.		• a discussion • an ongoing monitoring during classes	• Laboratory
Student can use physical measurement methodology, plan and perform simple physical measurements, analyse measurement data, interpret and present obtained results.		• an ongoing monitoring during classes • carrying out laboratory reports	• Laboratory
The student has a general knowledge in physics and physical measurement methodology, that allows to understand the basic physical phenomena of the surrounding world, knows their cause-effect relationship.		• an ongoing monitoring during classes	• Laboratory
Student can perform the analysis of experimental results and formulate appropriate conclusions.		• carrying out laboratory reports	• Laboratory
The student understand the need to improve professional and personal competencies; use various sources of information to broaden and deepen his/her knowledge.		• an ongoing monitoring during classes • carrying out laboratory reports	• Laboratory

Assignment conditions

The performance of the laboratory works together with their elaboration (in the form of written report that contain the analysis of the obtained result and description of the used method) is the main condition for passing of the course. The rating of the individual laboratory works consists of:

- rating of preparation for laboratory classes – 25%

- rating of performance of laboratory works – 25%

- rating of the prepared report – 50%.

Recommended reading

[1] D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, PWN, Warszawa 2003.

[2] D. Halliday, R. Resnick, J. Walker, Fundamentals of Physics, 9 ed., John Wiley Sons, 2011.

[3] R. P. Feynman, R. B. Leighton, M. Sands, Feynmana wykłady z fizyki, t.1 oraz t.2, PWN, Warszawa 2009

[4] R. P. Feynman, R. B. Leighton, M. Sands, The Feynman Lectures on Physics, Vol. I and II, New York: Basic Books, 2013.

[5] R. Resnick, D. Halliday, Fizyka, Wydanie piętnaste, PWN, Warszawa 2001.

[6] H. Szydłowski, Wstęp do pracowni fizycznej, Wydawnictwo Naukowe UAM, Poznań 1996.

Further reading

[1] H. Szydłowski, Pracownia fizyczna, PWN, Warszawa 1979.

[2] T. Dryński, Ćwiczenia laboratoryjne z fizyki, PWN, Warszawa 1973.

[3] H.D. Young, R. A. Freedman, A. Lewis Ford, *University Physics with Modern Physic,* Addison-Wesley, 1996.

[4] H. Szydłowski, Niepewności w pomiarach. Międzynarodowe standardy w praktyce, Wydawnictwo Naukowe UAM, Poznań 2001.

Notes

Modified by dr hab. Piotr Lubiński, prof. UZ (last modification: 01-08-2018 15:18)