



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physical Laboratory I [S1ETI2>IPracFiz]

Course

Field of study

Education in Technology and Informatics

Year/Semester

1/2

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

0

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

2,00

Coordinators

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Lecturers

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Prerequisites

Basic knowledge of physics and mathematics (high school curriculum and first-semester coursework). Ability to solve basic physics problems using acquired knowledge. Skills in gathering information from specified sources. Understanding the necessity of expanding personal competencies.

Course objective

1. Develop students' skills in solving basic physics problems, conducting simple experiments, and analyzing results based on acquired knowledge. 2. Provide experimental confirmation of fundamental physical phenomena and laws. 3. Foster teamwork skills among students.

Course-related learning outcomes

Knowledge:

Upon completing the course, students will:

1. Possess foundational knowledge in experimental physics, including mechanics, oscillatory motion, wave motion, electromagnetism, and optics.
2. Understand the basics of metrology, including measurement methods and analysis techniques.

Skills:

Students will be able to:

1. Gather information from literature, perform preliminary analysis of laboratory measurements, and draw conclusions independently.
2. Continuously engage in self-education.
3. Plan and conduct simple measurements, analyze and interpret results, identify and assess key factors affecting measurement accuracy, and document research findings.

Social competences:

Students will:

1. Work responsibly on assigned tasks, both individually and in teams.
2. Acknowledge the need for continuous learning.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes are assessed through oral and written responses related to laboratory exercises and written reports. Passing the course requires successful completion of at least 85% of scheduled exercises, with positive grades for responses and reports.

Grading Scale

- 50.1%-60.0%: Grade 3 (Satisfactory)
- 60.1%-70.0%: Grade 3.5 (Satisfactory Plus)
- 70.1%-80.0%: Grade 4 (Good)
- 80.1%-90.0%: Grade 4.5 (Very Good)
- 90.1% and above: Grade 5 (Excellent)

Programme content

1. Classical Mechanics
2. Oscillatory Motion
3. Wave Motion
4. Electromagnetism
5. Optics

Analysis of measurement results

Course topics

Students perform 13-14 experiments selected from 24 sets covering various areas of physics, including:

1. Mechanics (moment of inertia, Young's modulus, friction coefficient, linear expansion, viscosity, etc.)
2. Oscillatory motion (determining gravitational acceleration using mathematical and physical pendulums).
3. Wave Motion (measuring the speed of sound in air).
4. Electromagnetism (hysteresis loop, Lorentz force, electrical conductivity, transformer, etc.).
5. Optics (refractive index, focal length of lenses, photoelectric effect, diffraction, etc.).

Data Analysis:

Concepts covered include arithmetic mean, standard deviation, normal distribution, measurement uncertainty, linear regression, and graphical representation of results.

Teaching methods

- Pair-based laboratory exercises.
- Continuous progress monitoring.
- Detailed review of reports by the laboratory instructor.

- Discussion of calculations and conclusions.

Bibliography

Basic:

1. S. Szuba, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2007

Additional:

1. J. R. Taylor, Wstęp do analizy błędu pomiarowego, PWN, Warszawa 1995

2. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki t 1-5, PWN Warszawa 2003

3. K.Łapsa, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2008

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	0,50