



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics for computer scientists 2 [S1Inf1>FIZ2]

### Course

Field of study

Computing

Year/Semester

2/3

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

16

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

1,00

### Coordinators

dr Krzysztof Łapsa

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### Lecturers

### Prerequisites

The student starting the subject should have basic knowledge of physics and mathematics in the field of high school. Simple physical problems are expected to be solved based on knowledge and skills of obtaining information from the indicated sources. The student should also be ready to cooperate as part of a team.

### Course objective

1. Acquaintance with the basic methodology of physical measurements and interpretation of real measurement results through the construction of simple mathematical models based on physical laws and theories. 2. Enabling experimental confirmation of basic phenomena and physical laws. 3. Developing students' teamwork skills.

### Course-related learning outcomes

Knowledge:

1. has extended knowledge of experimental physics.
2. knows simple mathematical models: (e.g. linear, exponential, logarithmic) adequate to the interpretation of measurement data obtained from the study of simple physical phenomena.

### Skills:

1. is able to present the results of a real physical experiment (made during classes) in the form of a simple mathematical model, using elementary statistical methods (linear regression, determination of standard deviation) and widely available mathematical packages.
2. is able to plan and carry out a simple measurement experiment on selected physical phenomena specified in the program content and formulate conclusions.

### Social competences:

1. appreciates the importance of IT tools in improving measurement procedures carried out in a physical laboratory.
2. is aware of the importance of reliable documentation of measurement results, enabling verification of the correctness of measurement procedures and detection of potential errors in numerical data analysis.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Credit based on an oral or written response from the scope of content performed laboratory exercises and written reports. The prerequisite is to pass a minimum of 85% of the total planned for students exercises (positive assessment of the responses and reports).

### Programme content

During the semester the student performs 6-7 exercises out of 24 exercise sets on subjects from various branches of physics such as mechanics, vibrating motion, wave motion, heat, electromagnetism, optics, and modern physics. Learns and practically uses issues related to the development of measurement results: arithmetic mean, standard deviation, normal distribution, determination of uncertainty of simple and complex measurements, linear regression method, graphic presentation of the measurement results. These contents are implemented as part of the student's own work with support during classes and consultations.

### Teaching methods

Preparation for laboratory exercises is based on the instructions contained in the scripts. Exercises are performed in pairs, student progress is monitored on an ongoing basis, the laboratory leader reviews reports, discusses calculations and conclusions.

### Bibliography

#### Basic

1. K. Łapsa, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2008
2. S. Szuba, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2007

#### Additional

1. Fizyka dla szkół wyższych – free textbook available on the internet [www.openstax.pl](http://www.openstax.pl)
2. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki t 1-5, PWN Warszawa 2003
3. J. R. Taylor, Wstęp do analizy błędu pomiarowego, PWN, Warszawa 2018

### Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,00
Classes requiring direct contact with the teacher	16	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	14	0,50