COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics

Course

Field of study

Automatics and Robotics

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

English

Requirements

compulsory

Number of hours

Lecture

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Łukasz Piątkowski

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tel. 61 665 3165

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Responsible for the course/lecturer:

dr inż. Przemysław Głowacki

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Prerequisites

Student has well-structured knowledge in physics including the following fields: mechanics, optics, electricity, magnetism, fundamentals of quantum physics, selected problems of modern physics. Moreover, student is able to formulate and explain fundamental laws of physics in the range determined by the syllabus, are able to identify basic limitations of the laws and the range of their applications for description of phenomena in the real world. Student is able to use the recommended sources of information and understand the contents (list of fundamental literature) and are able to gain knowledge from other sources. Besides, student is able to use the fundamental laws of physics and simplified models in solving simple problems in the range determined by the syllabus. Furthermore, student is able to engage in solving basic problems, are able to extend their competence on their own.

Course objective

The objective of this course is presentation of fundamental knowledge of physics in the range determined by the syllabus of the subject of study. The aim of the course is to stimulate the development of the ability to solve simple problems, perform simple experiments and analyse/interpret their results on the basis of the knowledge acquired. Moreover, the goal of the course is the development of students' ability to work in a team

Course-related learning outcomes

Knowledge

1. Student knows and understands in an advanced level - selected facts, objects and phenomena and their methods and theories explaining the complex relationships between them, constituting basic general knowledge in selected areas of general physics including thermodynamics, electricity and magnetism, optics, photonics and acoustics, and solid state physics, including the knowledge necessary to understand basic physical phenomena occurring in and around automation and robotics components and systems; -[K1_W2 (P6S_WG)];

2. The graduate has an well-ordered and theoretically based knowledge of general mechanics: statics, kinematics and dynamics. The graduate knows and understands the principles of modelling and constructing simple mechanical systems; -[K1_W3 (P6S_WG)];

3. The graduate has a basic knowledge of metrology, knows and understands to an advanced level the methods of measuring electrical and non-electrical quantities; knows and understands to an advanced level the computational methods and IT tools necessary to analyse the results of the experiment; -[K1_W11 (P6S_WG)];

Skills

1. The graduate is able to obtain information from bibliography, databases and other sources; has the ability to self-educate in order to improve and update professional competences; -[K1_U1 (P6S_UW)];

2. The graduate is able to document and present the results of an engineering task; -[K1_U5 (P6S_UK)];

3. The graduate is able to apply the principles of health and safety at work; -[K1_U19 (P6S_UO)];

4. The graduate can plan and organize work, both individually and as part of a team, in accordance with the principles of health and safety at work; -[K1_U30 (P6S_UO)];

Social competences

1. The graduate is aware of responsibility for own work and willingness to conform to the principles of teamwork and taking responsibility for jointly implemented tasks; is able to lead a small team, set goals and set priorities leading to the implementation of the task. The graduate is ready to play a responsible professional role; -[K1_K3 (P6S_KR)];

2. The graduate is aware of the need for a professional approach to technical issues, meticulous familiarization with the documentation and environmental conditions in which the equipment and its components can operate. The graduate is ready to observe the rules of professional ethics and to demand it from others, to respect the diversity of opinions and cultures; -[K1_K5 (P6S_KR)];

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Passing of the course is based on oral or written response to questions concerning performed laboratory experiments, preparation of a written report on each laboratory experiment. The necessary condition of pass is to get positive mark for 85% of laboratory experiments (positive mark for the reports).

Programme content

Selected laboratory exercises from the three basic sections: mechanics, electromagnetism and optics. All the exercises are presented in details on webiste dedicated to the physics laboratory course (https://www.phys.put.poznan.pl/), as well as on YouTube channel "I Pracownia Fizyczna".

Teaching methods

Detailed refereeing of the exercise reports by the teacher, discussions over the comments provided, demonstrations, working in teams. Additional informations are provided within the course established on the e-Learning platform "eKursy" at the Poznan University of Technology.

Bibliography

Basic

1) St. Szuba, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań.

2) Krzysztof Łapsa, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2008.

3) Physics Laboratory Exercises, red. P. Głowacki, w wersji elektronicznej jako plik Phys_Lab_PUT.pdf

Additional

1) D. Holliday, R. Resnick, J. Walker, Fundamentals of Physics, Wiley 10th edition, 2014

2) S. J. Ling, J. Sanny, W. Moebs, University Physics, vol.1-3, Rice University (2018), (free downlad from: openstax.org)

3) H. Szydłowski, Pracownia fizyczna, PWN, Warszawa.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	34	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	26	1,0

[1] delete or add other activities as appropriate