COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics

Course

Field of study

Mechatronics

Year/Semester

1/1

Area of study (specialization)

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

15

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

dr inż. Przemysław Głowacki

email: przemyslaw.glowacki@put.poznan.pl

Faculty of Materials Engineering and Technical Physics, ul. Piotrowo 3, 60-965 Poznań, BM roomj 539

Responsible for the course/lecturer:

Prerequisites

Basic knowledge of physics and mathematics (core curriculum for high schools, basic level). The ability to solve elementary problems in physics based on knowledge and the ability to obtain information from specified sources. Understanding the need to broaden your competences, readiness to cooperate within a team.

Course objective

Mastering the basic knowledge of physics by students, to the extent specified in the program content

Mastering the students' ability to solve simple problems and perform simple experiments as well as analyze the results based on the knowledge obtained

Developing students' teamwork skills

Course-related learning outcomes

Knowledge

The student knows the basic physical concepts in the field covered by the program content relevant to the field of study and provide simple examples of their use in the surrounding world.

The student knows how to formulate and explain the basic physical laws in the scope covered by the curriculum content relevant to the field of study and determine the basic restrictions and scope of their applicability.

The student can give examples of the use of basic physical laws to describe phenomena in the surrounding world.

The student knows how to explain the purpose and meaning of simplified models in the description of physical phenomena

Skills

The student is able to apply the basic physical laws and simplified models in solving simple problems in the scope covered by program content.

Is able to use his knowledge of physics, supplemented with information obtained from literature and other sources to explain the principles of technical devices.

The student is able to make a qualitative and quantitative analysis of the results of simple physical experiments, formulate simple conclusions based on the results of calculations and measurements made.

The student is able to use the understanding of the indicated sources of knowledge (list of basic literature) and acquire knowledge from other sources.

The student is able to plan and carry out standard measurements of basic physical phenomena, identify and assess the importance of basic factors interfering with the measurement.

Social competences

The student is able to actively engage in solving the problems posed, independently develop and expand their competences.

Cooperate as part of a team, fulfill the responsibilities entrusted as part of the division of work within the team, demonstrate responsibility for own work and joint responsibility for the effects of team work.

The student knows how to act in accordance with the basic ethical principles.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

Knowledge acquired as part of the lecture is verified on the written test. The test consists of 20 questions and calculation tasks, equally scored. Passing threshold: 50.1%.

Tutorials:

The knowledge and skills acquired during the tutorials will be verified on the basis of the final test during the last class in the semester. The colloquium consists of 8 calculation tasks, of which the student is to solve 5 selected by him. Passing threshold 50.1%. Activity class is also scored.

Laboratories:

test and rewarding the knowledge necessary to implement the problems posed in a given area of laboratory tasks, assessment of knowledge and skills related to the implementation of the exercise task, evaluation of the report of the exercise.

Programme content

Lecture and tutorials:

Material point kinematics. Principles of point dynamics, examples of force models. Apparent forces in non-inertial systems. Momentum and principle of conservation of momentum. Center of mass of the points system. Work and energy. Examples of potential energy. The relationship of potential energy and strength. The principle of conservation of energy. The momentum of point and material points system. The principle of conservation of angular momentum. The basic problem of mechanics. Numerous examples of rigid body motion. Harmonic movement. The resonance phenomenon. Wave motion, superposition principle, Huygens principle, Fermat principle. Thermodynamics. Vector and scalar description of the electric field. Gauss's law. Laws describing electric current. Vector description of the magnetic field of Maxwell's law and their relationship with special relativity.

Laboratories:

Laboratory exercises will be performed in three main departments: mechanics, electromagnetism and optics. From each department, students working in teams of 2 will have at least 2 exercises to complete. The training sets are presented in detail on the website of the physical laboratory (https://www.phys.put.poznan.pl/).

Teaching methods

Lectures: lecture with multimedia presentation (including drawings, photos, animations, video materials) supplemented with examples given on the board, taking into account various aspects of the issues presented, including: economic, ecological, legal and social issues, presenting a new topic preceded by a reminder of related content, known to students in other subjects.

Tutorials: solving tasks from indicated textbooks, content of tasks selected to deal with practical issues occurring in technology and everyday life, discussion.

Laboratories:

detailed reviewing reports by the laboratory leader and discussions on comments, demonstrations, teamwork.

Bibliography

Basic

1. D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, t. 1-5, PWN Warszawa 2007

2. St. Szuba, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2007

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

4. K. Jezierski, B. Kołodka, K. Sierański, Fizyka. Zadania z rozwiązaniami t 1-2, Oficyna Wydawnicza Scripta, Wrocław

5. K .Sieranski, P. Sitarek, K. Jezierski, Repetytorium wzory i prawa z objasnieniami, Oficyna Wydawnicza Scripta, Wrocław 2002

Additional

1. R. P. Feynman, R. B. Leighton, M. Sands, Feynmana wykłady z fizyki tomy 1-2, PWN, Warszawa 2014

2. S. J. Ling, J. Sanny, W. Moebs, Fizyka - dla szkół wyższych, tomy 1-2, www.openstax.org, Polska 2018

3. J. Masalski, Fizyka dla inżynierów t.1-2, WNT Warszawa 1980

4. K. Jezierski, B. Kołodka, K .Sieranski, Wzory i prawa z objasnieniami, czesc II, Oficyna Wydawnicza Scripta, Wrocław 1995

5. K. Sieranski, J. Szatkowski Wzory i prawa z objasnieniami, czesc III, Oficyna Wydawnicza Scripta, Wrocław 1996

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	65	2,0
Student's own work (literature studies, preparation for exercises, preparation for tests / credit) [1]	60	3,0

[1] delete or add other activities as appropriate