COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1IFar2>Fiz]

Course

Field of study
Pharmaceutical Engineering

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
30

Laboratory classes
30

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

6,00

Coordinators

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Lecturers

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

1. Mastering the basic knowledge of physics by students, to the extent specified in the curriculum content
2. Students mastering the skills of solving simple problems and performing simple experiments as well as analyzing the results based on acquired knowledge 3. Developing teamwork skills in students

Course-related learning outcomes

Knowledge:
1. [K01] knows the basic physical concepts in the field covered by the curriculum content specific to the field of study and provide simple examples of their application in the surrounding world [K_W02, K_W03]
2. [K02] knows how to formulate and explain basic physical laws in the scope covered by the curriculum

contents relevant to the field of study and define the basic limitations and scope of their applicability [K_W03]
3. [K03] can give examples of the use of basic physical laws to describe phenomena in the surrounding world [K_W03]
4. [K04] can explain the purpose and meaning of simplified models in the description of physical phenomena [K_W02, K_W03]

Skills:
1. [S01] apply basic physical laws and simplified models in solving simple problems to the extent covered by the curriculum contents specific to the field of study [K_U1, K_U2]
2. [S02] make a qualitative and quantitative analysis of the results of simple physical experiments [K_U5, K_U12]
3. [S03] to formulate simple conclusions based on the results of calculations and measurements made [K_U2, KU_12]
4. [S04] make use of understanding from the indicated sources of knowledge (list of basic literature) and acquire knowledge from other sources [K_U1, K_U24]
5. [S05] plan and carry out standard measurements of basic physical phenomena, identify and evaluate the weight of basic factors interfering with the measurement [K_U12, K_U25]

Social competences:
1. [SC01] to actively engage in solving the problems posed, independently develop and expand their competences [K_K1]
2. [SC02] cooperate as part of a team, fulfill the obligations entrusted as part of the division of work in a team, demonstrate responsibility for own work and joint responsibility for the effects of team work [K_K2]
3. [SC03] follow the basic ethical principles [K_K8]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:
Ways to check learning outcomes
learning outcome (symbol) form of assessment
K01 written exam
K02 written exam
K03 written exam
K04 written exam
S01 report on laboratory exercises, written exam
S02 report on laboratory exercises
S03 report on laboratory exercises
S04 written exam, report on laboratory exercises
S05 report on laboratory exercises
SC01 assessment of activity during laboratory exercises
SC02 evaluation of the implementation of the laboratory exercise
Exam evaluation criteria:
grade % of points obtained
2.0 to 50.0 %
positive from 50.1 to 100.0 %
Final issues on the basis of which questions are prepared will be sent to students by e-mail using the university e-mail system.
Tutorials:
The knowledge and skills acquired during the exercises will be verified on the basis of a final test during the last classes of the semester. The colloquium consists of several computational tasks. The passing threshold is 50.1%. Activity during classes is also scored.
Laboratory exercises:
testing and rewarding the knowledge necessary to implement the set problems in a given area of laboratory tasks,
assessment of knowledge and skills related to the implementation of the exercise task, evaluation of the report from the exercise.
Obtaining additional points for activity during classes, and especially for:

- correct answers to questions asked during lectures,
- effectiveness of using the acquired knowledge while solving a given problem,
- remarks related to the improvement of didactic materials,
- aesthetic diligence of reports on laboratory exercises carried out as part of their own studies.

Programme content

The course program includes the following issues:
1) Introduction to classical physics.
2) Electric and magnetic field.
3) Introduction to quantum physics.
4) Elements of nuclear physics.
5) Spectroscopic methods in chemistry and physics.

Course topics

The course program includes the following issues:
1) Introduction to classical physics. Kinematics, dynamics, harmonic oscillator. Wave motion. Waves in elastic centers. Special relativity. Relativistic mechanics.
2) Electric and magnetic field. Charges and conductors in the electric and magnetic field. Maxwell's equations. Electromagnetic waves. Interaction of light with matter. Optics - interference, diffraction, polarization.
3) Introduction to quantum physics.
4) Elements of nuclear physics.
5) Spectroscopic methods in chemistry and physics - the basics
Tutorials:
Calculation the tasks from the two first points listed in the lecture programme content.
Laboratory:
Laboratory exercises will be performed in three main departments: mechanics, electromagnetism and optics. From each department, students working in 2-person teams will have at least 4 exercises to complete. Exercise 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 blackboard, taking into account different aspects of the issues presented, including economic, environmental, legal and social issues, presenting a new topic preceded by a reminder of related content, known to students from other subjects.
Tutorials: solving tasks from the indicated textbooks, the content of the tasks selected to address practical issues occurring in technology and everyday life, discussion.
Laboratory: detailed reviewing of reports by the laboratory's leaders and discussions on comments, demonstrations, work in teams.

Bibliography

Basic:
1. D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, t. 1-5, PWN Warszawa 2007
2. K. Jezierski, B. Kołodka, K. Sierański, Fizyka. Zadania z rozwiązaniami t 1-2, Oficyna Wydawnicza Scripta, Wrocław
3. K .Sieranski, P. Sitarek, K. Jezierski, Repetytorium wzory i prawa z objasnieniami, Oficyna Wydawnicza Scripta, Wrocław 2002
4. St. Szuba, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2007
5. K. Łapsa, Ćwiczenia laboratoryjne z fizyki, Wydawnictwo Politechniki Poznańskiej, Poznań 2008

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 wyzszych, tomy 1-2, www.openstax.org, Polska 2018
3. J. Masalski, Fizyka dla inżynierów t.1-2, WNT Warszawa 1980

Breakdown of average student's workload

	Hours	ECTS
Total workload	154	6,00
Classes requiring direct contact with the teacher	79	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	75	3,00