COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1AiR2>Fiz2]

Course

Field of study
Automatic Control and Robotics

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
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

dr Andrzej Jarosz
andrzej.jarosz@put.poznan.pl

Lecturers

Prerequisites

1.Knowledge in physics and analytical skills acquired in lectures and exercises in the first semester of study 2.Extended knowledge in mathematics, including differential and integral calculus 3.The ability to think logically, use mathematical tools and use them to solve physics tasks at high school level, the ability to learn comprehension and to obtain information from indicated sources 4.Understanding the need to broaden their competence, willingness to cooperate within the team

Course objective

1. Providing students with basic knowledge of physics, to the extent specified by the curriculum content appropriate to the field of study 2. Developing students' skills in solving simple problems and performing simple experiments as well as analyzing results based on the knowledge obtained

Course-related learning outcomes

Knowledge:
1.Student has ordered, theoretically founded general knowledge in selected branches of physics, including general mechanics, acoustics, electricity and magnetism, and optics and elements of modern physics, including the knowledge necessary to understand the basic physical phenomena occurring in

the elements and systems of automation and robotics, and their surroundings [K1_W2 (P6S_WG)];
2. Student is able to define and knows the basic concepts and physical laws and knows simple examples of their application in the surrounding world; has knowledge of the use of knowledge in physics to support the work of an engineer, knows the need to apply physics in engineering and technologies [K1_W2 (P6S_WG)];
3.Student has ordered theoretically founded and general knowledge in the field of general mechanics: kinematics and dynamics, including knowledge necessary to understand the principles of modeling and constructing simple mechanical systems [K1_W3 (P6S_WG)];

Skills:
1.Student is able to use the recommended sources of information and understand the contents (list of fundamental literature) and and acquire knowledge from other sources [K1_U1 (P6S_UW)];
2. Student knows how to apply basic physical laws and simplified models in solving simple problems to the extent covered by the curriculum content specific to the field of study [K1_U11 (P6S_UW)];

Social competences:
Student able to actively engage in solving the basic problems independently develop and expand their skills [K1_K1, K1_K5 (P6S_KK)]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Laboratory: assessment of preparation of issues necessary to perform the current exercise; checking the ability to perform the exercise. Assessment of the performance of the current exercise and protocol from the previous exercise

Programme content

1. Kinematics and dynamics of translational and rotational motion
2. Oscillations and waves
3. Thermodynamics
4. Properties of liquids and solids
5. Electric and magnetic field
6. Electric current - direct-current and alternating-current circuits
7. Electromagnetic induction
8. Geometric and wave optics
9. Selected problems in quantum physics - atomic structure, electrical conduction of solids, electric and magnetic properties of matter

Course topics

Laboratory subjects
1.Classical mechanics: classification of the modes of motion, kinematics and dynamics of translatory motion (including: laws of dynamics, conservation laws for energy and momentum), kinematics and dynamics of rotary motion (including: laws of dynamics, conservation law for angular momentum), harmonic oscillations, simple and driven (including: resonance phenomenon), mechanical waves, gravity interactions
2.Electromagnetism: electrostatics (including: Gauss law), electric current, magnetostatics (including: Ampere's law), electromagnetic induction (including: Faraday's law), electromagnetic waves
3.Optics: geometrical optics (including: reflection and refraction laws), wave optics (including: interference and diffraction)

Teaching methods

Laboratory: laboratory exercises in the field of mechanics, electricity and optics

Bibliography

Basic:
1. D.Halliday, R.Resnick, J.Walker, Podstawy fizyki t 1-5, PWN Warszawa 2003
2. K.Jezierski, B.Kołodka, K.Sierański, Fizyka. Zadania z rozwiązaniami t 1-2, Oficyna Wydawnicza Scripta,

Wrocław
3. J.Kalisz, M.Massalska, J.M.Massalski, Zbiór zadań z fizyki, część I i II, Wydawnictwo Naukowe PWN, Warszawa 1987

Additional:
1. J.Masalski, Fizyka dla inżynierów t.1-2, Wydawnictwa Naukowo-Techniczne, 2006
2. Openstax - Fizyka dla szkół wyższych
tom1: https://openstax.org/details/books/fizyka-dla-szkół-wyższych-tom-1
tom2: https://openstax.org/details/books/fizyka-dla-szkół-wyższych-tom-2
tom3: https://openstax.org/details/books/fizyka-dla-szkół-wyższych-tom-3

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50