COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics (course in English)

Course

Field of study

Automatic Control and Robotics

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

English

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Materials Engineering&Technical Physics

Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

1 Knowledge: fundamental knowledge of physics; basic level according to the secondary school syllabus – (PQF 4), knowledge of mathematics including integration and differentiation calculus

2 Skills: ability to solve elementary problems in physics on the basis of acquired knowledge, ability to draw information from recommended textbooks

3 Social competencies: understanding of the need to extend knowledge of physics as the base to all other technical and engineering subjects and the level of competence, in general; readiness to work in group

Course objective

1. Presentation of fundamental knowledge of physics in the range determined by the syllabus of the subject of study

2. Development of the ability to solve simple problems, perform simple experiments and analyses/interpret their results on the basis of the knowledge acquired

Course-related learning outcomes

Knowledge

1. possessing fundamental knowledge in the following areas of physics: mechanics, optics, electricity, magnetism, fundamentals of quantum physics, selected problems of modern physics – [K1_W2 (P6S_WG)]

2. being able to formulate and explain the fundamental laws of physics in the range determined by the syllabus of the curriculum, possessing knowledge enabling identifications the basic limitations of the laws and the range of their applications for explanation of phenomena in the real world - [K1_W3 (P6S_WG)]

Skills

1. are able to use the recommended sources of information and understand theirs contents (list of fundamental textbooks) and are able to gain knowledge from other sources - [K1_U1 (P6S_UW)]

2. are able to use the fundamental laws of physics and simplified models in solving simple problems in the range determined by the curriculum syllabus - [K1_U2 (P6S_UW)]

Social competences

1. are able to engage in solving basic problems, are able to extend their competence on their own – [K1_K1 (P6S_KK)]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: pass on the basis of a written and an oral exams (score scale, fewer than 50% correct answers < insufficient, 50.1-60% □ sufficient, 60.1-70% □ sufficient plus, 70.1-80% □ good, 80.1-90% - good plus, from 90.1% □ very good).

Programme content

1. Classical mechanics including:

- kinematics and dynamics of translational motion (laws of dynamics, law of energy and moment of momentum conservation)

- kinematics and dynamics of rotational motion (laws of dynamics, law of moment of momentum conservation)

- harmonic vibrations free and forced (including the resonance phenomenon)

- mechanical waves

- gravitation

2. Fundamentals of special theory of relativity

3. Electromagnetism:

- electrostatics (including the Gauss law)

- electric current

- magnetostatics (including the Ampere law)

- electromagnetic induction (the Faraday law)

- electromagnetic waves (energy, momentum, polarisation)

4. Optics:

- geometric optics (the law of light reflection and refraction)

- wave optics (interference and diffraction)

5. Fundamentals of quantum physics:

- quantum character of light

- elementary problems of the structure of atom

6. Elements of modern physics (selected problems, e.g. Nanoscience and Nanotechnology)

Teaching methods

Lectures supported with PowerPoint Presentations and demostrations of physical phenomena

Bibliography

Basic

1. R.A. Serway and J.W. Jewet t, Jr., Physics for Scientists and Engineers with Modern Physics – Technology Update. 9th Edition, Cengage Learning, 2014

2. David Halliday, Robert Resnick, and Jearl Walker, Fundamentals of Physics10th edition, John Wiley & Sons, Inc. (published 2013). Also edition in Polish: Podstawy Fizyki, t.1 I t2, PWN(2015).

Additional

1. H.D. Young and R.A.Freedman, University Physics with Modern Physics, 12th edition, Pearson& Addison-Wesley 2008.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	2,0
Student's own work (literature studies, preparation for tests/exam) [1]	35	1,0

[1] delete or add other activities as appropriate