COURSE DESCRIPTION CARD - SYLLABUS

Course name
Physics [S1AiR1E>Fiz1]

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
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

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:
Knows and understands to an advanced extent - selected facts, objects and phenomena, as well as methods and theories related to them, explaining complex interrelationships between them, being basic

general knowledge in the scope of selected branches of general physics covering: thermodynamics, electricity and magnetism, optics, photonics and acoustics, and rigid body physics;
this should include knowledge necessary to understand basic physical phenomena occurring in and around automation and robotics components and systems [K1_W2 (P6S_WG)].
Has a structured and theoretically grounded general knowledge of general mechanics: statics, kinematics and dynamics, including the knowledge necessary to understand the principles of modelling and design of simple mechanical systems [K1_W3 (P6S_WG)].
Skills:
Is able to obtain information from literature, databases and other sources also in a chosen foreign language [K1_U1 (P6S_UW)].
Can interpret with understanding the design technical documentation and simple technological diagrams of automation and robotics systems [K1_U2 (P6S_UW)].
Social competences:
Is ready to critically assess his/her knowledge; understands the need for and knows the possibilities of continuous training - improving professional, personal and social competence, is able to inspire and organize the learning process of others [K1_K1 (P6S_KK)].
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:

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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)

Course topics

none

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	70	3,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50