



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics

Course

Field of study

Electrical Engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

30

Tutorials

15

Laboratory classes

Projects/seminars

Other (e.g. online)

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr hab. Danuta Stefańska

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Responsible for the course/lecturer:

Prerequisites

Basic knowledge concerning physics and mathematics (program base for secondary school, basic level). Solving elementary physical problems based on acquired knowledge, ability to acquire information from given sources. Understanding of necessity of own competence broadening, readiness to cooperate within group.



Course objective

Transferring to students basic knowledge concerning physics with special emphasis on applications in technical sciences. Developing students abilities to solve physical problems, to perceive potential applications in studied subject, performing experiments and analyzing the results based on acquired knowledge. Developing students abilities of self-education and team work.

Course-related learning outcomes

Knowledge

Advanced knowledge of the problems within the scope of the course program with special emphasis on their applications in studied subject. Basic knowledge about constructing, principles of working and lifetime of modern engineering systems.

Skills

Using (with understanding) recommended knowledge sources (catalog data, applications notes) and derive knowledge from other sources for self-education purpose. Carry out and analyze basic physical experiments and measurements on electrical systems with results interpretation and presentation in numerical and graphical forms.

Social competences

Understanding of role of knowledge in problems solutions and in increasing level of professional, personal and social skills. Ability of logical and enterprising thinking in electrical engineering field.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- written exam: 25 test questions + 1 problem issue (choice from several proposed options)
- tests concerning individual lectures
- current evaluation of students activity

Math exercises:

Substantial evaluation of methods of problem solving: proper physical formula application, logical line of thinking, mathematical efficiency in formula calculations also with numerical data and units, capabilities to solve problems using different methods, clarity and aesthetics of task solutions, current evaluation of students activity

Programme content

1. Classical mechanics, including: motion classification, work, power, potential and kinetic energy, conservative and non-conservative forces, kinematics and dynamics of linear and rotary motion (laws of dynamics and conservation rules), harmonic free vibrations, damped vibrations, forced vibrations (resonance), description of periodic processes with vector diagrams, mechanical waves,
2. Gravitational interactions, including: law of universal gravitation, scalar and vector description of gravitational field, introduction to general relativity



3. Introduction to special relativity

4. Thermodynamics, including: temperature, 0th law of thermodynamics, heat, heat conduction, 1st law of thermodynamics, elements of kinetic gas theory, gas processes, entropy, heat machines, 2nd law of thermodynamics

5. Electrostatic interactions, including: Coulomb law, scalar and vector description of electrical field, Gauss law, electric current (Ohm and Kirchhoff laws), electric properties of the matter, capacitance

6. Electromagnetic interactions, including: magnetostatics (Gauss, Ampere's, Biot-Savart's laws), magnetic properties of the matter, charge movement in magnetic field (Lorentz's, electrodynamic forces), electromagnetic induction (Faraday's law), Maxwell's equations

Teaching methods

Lecture: multimedial presentation including movies and animations, experimental demonstrations

Math exercises: solving problems, discussion of the results

Bibliography

Basic

D.Halliday, R.Resnick, J.Walker, Fundamentals of Physics, Wiley 2009

OpenStax, Physics, t. 1-3 (collective work) <https://openstax.pl/pl/>

K.Jeziński, B.Kołodka, K.Sierański, Physics. Problems with solutions, Scripta, Wrocław 2007

Additional

J.Massalski, M.Massalska, Physics for engineers, WNT, Warszawa 2006

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	4,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for math exercises, preparation for tests/exam) ¹	60	2,0

¹ delete or add other activities as appropriate