



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Physics

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### 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

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### Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

15

Projects/seminars

### Number of credit points

4

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### Lecturers

Responsible for the course/lecturer:

dr inż. Adam Buczek

Responsible for the course/lecturer:

adam.buczek@put.poznan.pl

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### 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

Hand over basic knowledge concerning physics with special emphasis on applications in technical sciences. Develop students abilities to solve physical problems, to perceive potential applications in studied subject, doing experiments and analyze results based on acquired knowledge. Mould students abilities within group cooperation.

## Course-related learning outcomes

### Knowledge

Advanced knowledge within classical mechanics, thermodynamics, gravity and electrical interactions 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:

Oral or written exam that is aimed at students knowledge evaluation based on their explanations of chosen physics problems, 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

Classical mechanics: movement classification, work, power, potential and kinetic energy, conservative and non-conservative forces, kinematics and dynamics of linear and curvilinear motion (dynamics and conservation rules), harmonic free vibrations, forced vibrations (resonance), damping vibrations, description of periodic processes with vector diagrams, mechanical waves, Thermodynamics: temperature, 0 thermodynamics law, heat, heat conduction, 1st law of thermodynamics, elements of kinetic gas theory, gas processes, heat machines, 2nd law of thermodynamics,

Gravitational interactions: law of universal gravitation, scalar and vector description of gravitational field.



Electrical interactions: Coulomb law, scalar and vector description of electrical field, Gauss law, electrical conductors (Ohm and Kirchhoff laws), electrical properties of matter, capacitance.

### Teaching methods

Lecture: multimedial presentation, animations, movies.

Math exercises: multimedial presentations, simulations, practical exercises.

### Bibliography

Basic

E-learning Moodle course available under address:

<https://moodle.put.poznan.pl/course/index.php?categoryid=418>

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

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) <sup>1</sup>	60	2,0

<sup>1</sup> delete or add other activities as appropriate