



## 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

1/2

Profile of study

practical

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

15

Tutorials

15

Laboratory classes

15

Projects/seminars

Other (e.g. online)

### Number of credit points

4

### Lecturers

Responsible for the course/lecturer:

dr inż. Adam Buczek

adam.buczek@put.poznan.pl

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

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 electromagnetics, optics and chosen aspects of modern physics 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

### Laboratory:

Oral or written verification of students mastering of basic description of observed phenomenon, evaluation of technical and correctness of measurement realization in frame of exercise and written acquisition of results, evaluation of written report: description of result and measurement uncertainties, conclusions validity, clarity and aesthetics of report, evaluation of ability to cooperate within group, current evaluation of students activity

## Programme content



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

Optics: geometrical optics (reflection and refraction laws), wave optics (interference and diffraction)

Modern physics achievements: elements of special relativity theory, quantum theory basic elements, chosen aspects of atomic, molecular, solid state, nuclear and particles physics problems connected with study

### Teaching methods

Lecture: multimedial presentation, animations, movies.

Math exercises: multimedial presentations, simulations, practical exercises.

Laboratory: simulations, experiments supported also by computer.

### 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	122	4,0
Classes requiring direct contact with the teacher	62	2,0
Student's own work (literature studies, preparation for math and laboratory exercises, preparation for tests/exam) <sup>1</sup>	60	2,0

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