



## 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

general academic

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 hab. Danuta Stefańska

danuta.stefanska@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

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: 15 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

### 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

1. Electromagnetic waves (including: polarization)



2. Optics, including: geometrical optics (reflection and refraction laws, mirrors and lenses), wave optics (interference and diffraction)
3. Introduction to quantum physics
4. Modern physics achievements: selected problems of atomic, molecular, solid state, nuclear and elementary particle physics, problems related to the course of study

### Teaching methods

Lecture: multimedial presentation including movies and animations, experimental demonstrations

Math exercises: solving problems, discussion of the results

Laboratory: simulations, experiments (also computer-supported)

### 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.Jezierski, 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