STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Physics		**1010321221010430037**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**(brak)**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours				No. of credits
Lecture: **1**	Classes: **1**	Laboratory: **1**	Project/seminars: **-**	**4**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**4 100%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

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

Assumptions and objectives of the course:

1.Hand over basic knowledge concerning physics with special emphasis on applications in technical sciences.

2.Develop student?s abilities to solve physical problems, to perceive potential applications in studied subject, doing experiments and analyze results based on acquired knowledge

3.Mould student?s abilities within group cooperation.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Define basic physical terms and quantities with proper units and give examples of their applications in real cases and technical sciences - [K_W03 +++]

2. Form and explain basic physical laws, define their range of applications with special emphasis on studied subject - [K_W03 +++ K_W06 ++]

3. Explain measurement method of basic physical quantities and resolve sources of uncertainties - [K_W05 ++]

Skills:

1. Apply basic physical laws and simplified models for solving of simple problems and task in range of technical sciences - [K_U10 +]

2. Plan and execute standard measurements of basic physical quantities, identify and evaluate measurement noises - [K_U02 ++ K_U06 +]

3. Do qualitatively and quantitatively analysis (in graphical form too) of results of physical experiments - [K_U02 ++]

4. Form conclusions based on calculation results and measurements done - [K_U02 ++]

5. Use (with understanding) recommended knowledge sources (basic literature index) and derive knowledge from other sources for self-education purpose - [K_U05 ++ K_U09 ++]

Social competencies:

1. Cooperation within group, fullfilling work duties, take responsibility for the results of both own and team work - [K_K03 ++]

Assessment methods of study outcomes

Lecture:

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

Math exercises:

Substantial evaluation of methods of problem solving: proper physical formula application, logical 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

Course description

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

Basic bibliography:

1. D.Halliday, R.Resnick, J.Walker, Fundamentals of Physics, Wiley 2009
2. K.Jezierski, B.Kołodka, K.Sierański, Physics. Problems with solutions, Scripta, Wrocław 2007
3. St.Szuba, Physics Laboratory , Poznan University of Technology, Poznan 2007

Additional bibliography:

1. J.Massalski, M.Massalska, Fizyka dla inżynierów t.1-2, WNT, Warszawa 2006
2. H. Szydłowski, Physics Laboratory, PWN, Warszawa 2003

Result of average student's workload

Activity	Time (working hours)

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	50	0
Practical activities	30	0