STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Physics		**1010341721010430037**
Field of study	Profile of study (general academic, practical)	Year /Semester
Mathematics in technology	**(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: **30** Classes: **30** Laboratory: **-** 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 %)
the sciences		**4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	knowledge of physics (core cirriculum for secondary schools, basic level) and mathematics core cirriculum for secondary schools, advanced level)
2	**Skills**	skill of solving elementary problems in physics base on knowledge, skill in obtaining information from indicated sources
3	**Social competencies**	understanding the need for education in order to obtain the relevant qualifications to perform in the future of the profession and social roles

Assumptions and objectives of the course:

1. Providing to students basic knowledge of physics in the field specified by the content of the curriculum relevant to the field of study: Mathematics in technology.
2. Developing of skills of mathematical description and interpretation of the observed phenomena in the surrounding world based on the known laws of physics.
3. Developing of the ability to solve simple problems in the field of physics on the basis of the obtained knowledge.

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

Knowledge:

1. Has knowledge in the field of selected issues including classical mechanics, gravitation, vibrational and wave motion, thermodynamics, electricity and magnetism, electromagnetic waves, optics, theory of relativity and modern physics - [K_W10]
2. Knows applications basic laws of physics in the field of selected issues including classical mechanics, gravitation, vibrational and wave motion, thermodynamics, electricity and magnetism, electromagnetic waves, optics, theory of relativity and modern physics to description of phenomena in the surrounding world - [K_W10]

Skills:

1. Is able to apply basic laws of physics and simplified mathematical models to solving simple problems in the field including classical mechanics, gravitation, vibrational and wave motion, thermodynamics, electricity and magnetism, electromagnetic waves, optics, theory of relativity and modern physics - [K_U06, K_U07, K_U08]
2. Is able to recognize, explain and describe mathematically physical phenomena in the surrounding world on the basis theoretical knowledge related to selected issues of physics - [K_U06, K_U07, K_U08]
3. Is able to use with understanding from specified sources of knowledge (e.g. references, databases) and is active in extraction of knowledge from other sources - [K_U18]

Social competencies:

1. Is able to actively engage in solving of posed problems, raising his or her professional, personal and social competences - [K_K01]
2. Follows the rules of professional ethics, is responsible for the reliability of results obtained in his or her work and their interpretation, and the assessment of work done by others - [K_K04]

Assessment methods of study outcomes			
W01-W02	written exam/oral		
		3	50.1%-70.0%
		4	70.1%-90.0%
		5	od 90.1%
U01-U03	test		
		3	50.1%-70.0%
		4	70.1%-90.0%
		5	od 90.1%
K01-K02	evaluation of activity on classes		
		3	50.1%-70.0%
		4	70.1%-90.0%
		5	od 90.1%
Course description			

1. The basics of classical mechanics:
- kinematics and dynamics of translational motion (Newton's laws, conservation of energy and momentum including),
- kinematics and dynamics of rotational motion (Newton's laws for rotational motion, conservation of angular momentum),
- simple harmonic motion, damped and forced oscillations (resonance including),
- mechanical waves,
- elements of acoustics.
2. Grawitation.
3. Thermodynamics:
- laws of thermodynamics,
- the kinetic theory of gases,
- energy transfer mechanisms in thermal processes,
- thermal expansion,
- thermal insulation.
4. Elecricity and magnetism:
- electrostatics,
- magnetostatics,
- motion of charged particle in electric and magnetic uniform field,
- Faraday's law of induction,
- Maxwell's equations,
- electromagnetic waves,
- electric and magnetic properties of matter,
- band theory of solids (metals, insulators and semiconductors),
5. Optics:
- basics of geometrical optics (optical instruments),
- wave optics (dispersion, interference, diffraction and polarization of light),
- transmission of waves from the range UV, VIS and IR, optical fibers technology,
- lasers and their applications.
6. Special theory of relativity.
7. Modern physics:
- Bohr's model of hydrogen atom,
- quantum nature of light (the photoelectric effect, the Compton effect),
- the wave properties of particles (de Broglie wavelength),
- Schrodinger equation,
- potential well,
- tunneling through a potential energy barrier (scanning electron microscope STM),
- properties of matter in nanoscale, quantum effects.

Basic bibliography:

1. R.A. Serwey, J.H. Jewett, Physics for Scientists and Engineers with Modern Physics, eight edition, Belmont USA 2010.
2. D. Halliday, R.Resnick, J.Walker, Podstawy fizyki, t. 1-5, PWN, Warszawa 2003.
3. W. Bogusz, J. Garbarczyk, F. Krok, Podstawy fizyki, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1999.
4. K. Jezierski, B.Kołodka, K.Sierański, Fizyka. Zadania z rozwiązaniami, t. 1-2, Oficyna Wydawnicza Scripta, Wrocław 2009.
5. N. Kucenki, J. W. Rublewa, Zbiór zadań z fizyki dla wyższych uczelni technicznych, PWN, Warszawa 1997.

Additional bibliography:

1. Masalski, Fizyka dla inżynierow, t.1-2, WNT, Warszawa 1980.

Result of average student's workload

Activity	Time (working hours)

1. participation in lectures	30
2. participation in classes	30
3. preparation to classes	15
4. preparation to tests (2 tests)	10
5. . take a part in consultation related with realization of educational process	4
6. preparation to exam	20
7. participation in exam	2

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	111	4
Contact hours	66	0
Practical activities	0	0