

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Physics		Code 1010341721010440037
Field of study Mathematics in Technology	Profile of study (general academic, practical) general academic	Year /Semester 1 / 2
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: 30 Laboratory: - Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) basic		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 4 100%
Responsible for subject / lecturer: Dr. Sci. Tomasz Runka email: tomasz.runka@put.poznan.pl tel. +48 61 6653155 Faculty of Technical Physics ul. Piotrowo 3, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Knowledge of physics (core curriculum for secondary schools, basic level) and mathematics core curriculum 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. She/he 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. She/he 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. She/he 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. She/he 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. She/he is able to actively engage in solving of posed problems, raising his or her professional, personal and social competences - [K_K01]
2. She/he 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 (during exam session)
	3	50.1%-70.0%
	4	70.1%-90.0%
	5	od 90.1%
U01-U03		tests (7th and 14th week of the semester)
	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		

<p>1. The basics of classical mechanics:</p> <ul style="list-style-type: none"> - 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. <p>2. Gravitation.</p> <p>3. Thermodynamics:</p> <ul style="list-style-type: none"> - laws of thermodynamics, - the kinetic theory of gases, - energy transfer mechanisms in thermal processes, - thermal expansion, - thermal insulation. <p>4. Electricity and magnetism:</p> <ul style="list-style-type: none"> - 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), <p>5. Optics:</p> <ul style="list-style-type: none"> - 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. <p>6. Special theory of relativity.</p> <p>7. Modern physics:</p> <ul style="list-style-type: none"> - 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. 	
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 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. 	
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Masalski, Fizyka dla inżynierów, t.1-2, WNT, Warszawa 1980. 	
<p>Result of average student's workload</p>	
<p>Activity</p>	<p>Time (working hours)</p>

1. participation in lectures	30	
2. participation in classes	30	
3. preparation for 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