



Subject card

Subject name and code	Physics II, PG_00033414						
Field of study	Mechatronics, Mechatronics						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2020/2021		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Physics of Electronic Phenomena -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marcin Dampc				
	Teachers		dr inż. Marcin Dampc				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study	SUM	
	Number of study hours	30	5.0		65.0	100	
Subject objectives	Presentation and analysis of physical phenomena and quantities typical for: gravity, hydrostatics, hydrodynamics, thermodynamics, electromagnetic waves, wave optics, solid state physics, electrical and magnetical properties of matter, nuclear physics						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U03		Ability of using complementary materials on e-learning platform On the basis of examples during lectures student analyses the mistakes of designers and engineers		[SU1] Assessment of task fulfilment		
	K6_W02		Student analyzes the physical phenomena and solve simple problems in the art based on the laws of physics		[SW1] Assessment of factual knowledge		
	K6_U01		Ability of using functionalities of e-learning platform (forum, chat, wiki, choice, survey) Ability of using complementary materials on e-learning platform and individual studies of related problems		[SU4] Assessment of ability to use methods and tools		
Subject contents	LECTURES: Gravity: law of universal gravitation, gravitational field strength and potential. Keplers laws, satellites, cosmic velocities. Thermodynamics: I law of thermodynamics, ideal gas changes, graphical interpretation of work. II law of thermodynamics, Carnot cycle, Carnot engine, entropy, III law of thermodynamics. Hydrostatics: properties of liquids, Pascals law, hydrostatic pressure, Archmedes principle, buoyancy. Hydrodynamics: fluid flow, Bernoullis theorem, viscosity, laminar flow and turbulent flow, Reynolds number. Electromagnetic waves: propagation, energy of electromagnetic field, Pointings vector, spectrum of electromagnetic waves. Wave optics: Huyghens principle, diffraction and interference of light, diffraction grating. Polarization of light: methods of polarization, Malus law, Brewsters law. Solid state physics: electric properties of materials, electric conductivity of metals, band structure of solids, Fermi-Dirac function, band structure of metals, semiconductors and insulators. Intrinsic and doped semiconductors, junctions and theirs applications: LED, laser, photovoltaic cell. Nuclear physics: structure of atom, Rutherford experiment, properties of atomic nucleus, bond energy of atomic nucleus, models of nucleus. Radioactivity: decay law, sample activity, types of radioactive decay, radiation-matter interaction. Absorption and detection of radiation.						
Prerequisites and co-requisites	Course credit Physics I - E (07001W0) and Physics I (07021C0)						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Midterm colloquium		50.0%		100.0%		

Recommended reading	Basic literature	1. Cz. Bobrowski, Fizyka - krótki kurs, WNT, Warszawa 1979, 1993 2. M. Skorko, Fizyka, PWN, Warszawa 3. J.Orear, Fizyka t. 1,2, WNT Warszawa 4. K.Kozłowski, R.Zieliński, I laboratorium z fizyki, cz.1, WPG 2003.
	Supplementary literature	1. D.Halliday, R.Resnick, J. Walker, Podstawy fizyki t. 2,4, 5, PWN, Warszawa
	eResources addresses	
Example issues/ example questions/ tasks being completed	Calculate the number of nuclei of radioactive isotope in a function of time knowing the half life is T .	
Work placement	Not applicable	