



## Subject card

Subject name and code	Physics II, PG_00058752						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
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			exam		
Conducting unit	Zakład Metod Obliczeniowych Fizyki Chemicznej -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Małgorzata Franz				
	Teachers		dr Małgorzata Franz dr inż. Damian Głowienka dr inż. Ewa Erdmann				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	30.0	0.0	0.0	0.0	45
	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	45	5.0		58.0		108
Subject objectives	The aim of the course is to familiarize students with the issues of classical mechanics, electrodynamics and elements of modern physics.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W02] has knowledge of physics, including mechanics, thermodynamics, optics, electricity and magnetism, nuclear physics and solid state physics, including knowledge necessary to: 1) understand the basic physical phenomena related to material durability, fluid mechanics and hydraulics, building physics, geodetic measurements ; 2) understanding the principles of operation of basic electrical devices and systems; 3) solving project tasks of the sanitary industry;	The student describes and interprets the basic physical phenomena, predicts the course of phenomena based on the learned laws, performs logical reasoning adequate to the solved physical problem.			[SW1] Assessment of factual knowledge		
	[K6_U01] has the ability to self-education, can obtain information from literature, databases and other sources, uses information technology, Internet resources; can integrate the obtained information, make their interpretation, as well as draw conclusions and formulate and justify opinions	The acquired knowledge allows for independent analysis of selected physics issues in the surrounding reality. The student carries out correct calculations and does transformations on units.			[SU4] Assessment of ability to use methods and tools		

Subject contents	<p><b>LECTURES: Static equilibrium and elasticity:</b> conditions of static equilibrium and its examples, stress, strain and elastic modulus, elasticity and plasticity. <b>Temperature and amount of heat:</b> temperature, temperature measurement, thermal expansion of solids and fluids, amount of heat, specific heat, heat of fusion and heat of vaporization. <b>Heat transport:</b> convection, thermal conduction, thermal radiation, use of solar thermal energy. <b>Laws of thermodynamics:</b> quantities describing the state of a system, the first law of thermodynamics, the second law of thermodynamics, the Carnot cycle, entropy, the third law of thermodynamics. <b>Fluids:</b> density, pressure and viscosity, fluids at rest, Pascal's law and hydraulic press, Archimedes' law (floating bodies, apparent weight in a fluid). <b>Fluid dynamics:</b> motion of ideal fluids, continuity equation, Bernoulli equation. <b>Mechanical vibrations and waves:</b> simple, damped and forced harmonics, mechanical waves, superimposition of waves, deflection, reflection and refraction of waves, standing waves, the Doppler effect. <b>Electrostatics, electric current and magnetostatics:</b> Coulomb's law and electric field, electric current intensity and density, electric resistance and specific resistance, Ohm's law, magnetic field, Lorentz force, charge movement in a magnetic field, electrodynamic force. <b>Nuclear energy:</b> atom and its nucleus, nuclear fission, nuclear reactor, thermonuclear fusion.</p> <p><b>TUTORIALS:</b> . 1. Introduction to the subject. 2. Equilibrium conditions. 3. Heat transport. 4. Laws of thermodynamics. 5. Fluid mechanics. 6. Fluid dynamics. 7. Vibrations. 8. Waves. 9. Electric field I. 10. Electric field II. 11. Direct current and capacitors. 12. Magnetic field I. 13. Magnetic field II. 14. Nuclear physics.</p>											
Prerequisites and co-requisites	Knowledge from "Physics I" - semester I											
Assessment methods and criteria	<table border="1" data-bbox="448 680 1487 786"> <thead> <tr> <th data-bbox="448 680 794 712">Subject passing criteria</th> <th data-bbox="794 680 1141 712">Passing threshold</th> <th data-bbox="1141 680 1487 712">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 712 794 743">Midterm colloquium</td> <td data-bbox="794 712 1141 743">50.0%</td> <td data-bbox="1141 712 1487 743">50.0%</td> </tr> <tr> <td data-bbox="448 743 794 786">Written exam</td> <td data-bbox="794 743 1141 786">50.0%</td> <td data-bbox="1141 743 1487 786">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Midterm colloquium	50.0%	50.0%	Written exam	50.0%	50.0%
Subject passing criteria	Passing threshold	Percentage of the final grade										
Midterm colloquium	50.0%	50.0%										
Written exam	50.0%	50.0%										
Recommended reading	<table border="1" data-bbox="448 792 1487 1294"> <tbody> <tr> <td data-bbox="448 792 794 994">Basic literature</td> <td colspan="2" data-bbox="794 792 1487 994">           1. D.Holiday, R.Resnick, J.Walker. Podstawy fizyki. T.1 - T.5; PWN, Warszawa 2003. 2. Cz. Bobrowski. Fizyka. Krótki kurs; WNT, Warszawa (dowolne wydanie).             2. University Physics V. 1. - V. 3. ISBN-13: 978-83-948838-1-2         </td> </tr> <tr> <td data-bbox="448 994 794 1055">Supplementary literature</td> <td colspan="2" data-bbox="794 994 1487 1055">           1.J.Orear. Fizyka T.1 i T.2; WNT, Warszawa (dowolne wydanie).            2.J.Massalski. Fizyka dla inżynierów. T.1 i T.2; WNT, Warszawa 2007.         </td> </tr> <tr> <td data-bbox="448 1055 794 1294">eResources addresses</td> <td colspan="2" data-bbox="794 1055 1487 1294">           Podstawowe  <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-2">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-2</a> - University Physics Volume 2  <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-3">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-3</a> - University Physics Volume 3  <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-1">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-1</a> - University Physics Volume 1            Adresy na platformie eNauczenie:         </td> </tr> </tbody> </table>			Basic literature	1. D.Holiday, R.Resnick, J.Walker. Podstawy fizyki. T.1 - T.5; PWN, Warszawa 2003. 2. Cz. Bobrowski. Fizyka. Krótki kurs; WNT, Warszawa (dowolne wydanie).  2. University Physics V. 1. - V. 3. ISBN-13: 978-83-948838-1-2		Supplementary literature	1.J.Orear. Fizyka T.1 i T.2; WNT, Warszawa (dowolne wydanie). 2.J.Massalski. Fizyka dla inżynierów. T.1 i T.2; WNT, Warszawa 2007.		eResources addresses	Podstawowe <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-2">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-2</a> - University Physics Volume 2 <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-3">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-3</a> - University Physics Volume 3 <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-1">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-1</a> - University Physics Volume 1 Adresy na platformie eNauczenie:	
Basic literature	1. D.Holiday, R.Resnick, J.Walker. Podstawy fizyki. T.1 - T.5; PWN, Warszawa 2003. 2. Cz. Bobrowski. Fizyka. Krótki kurs; WNT, Warszawa (dowolne wydanie).  2. University Physics V. 1. - V. 3. ISBN-13: 978-83-948838-1-2											
Supplementary literature	1.J.Orear. Fizyka T.1 i T.2; WNT, Warszawa (dowolne wydanie). 2.J.Massalski. Fizyka dla inżynierów. T.1 i T.2; WNT, Warszawa 2007.											
eResources addresses	Podstawowe <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-2">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-2</a> - University Physics Volume 2 <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-3">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-3</a> - University Physics Volume 3 <a href="https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-1">https://openstax.org/details/books/fizyka-dla-szk%C3%B3%C5%82-wy%C5%BCszych-tom-1</a> - University Physics Volume 1 Adresy na platformie eNauczenie:											
Example issues/ example questions/ tasks being completed	<p>Sample exam question: Explain when a body is in static equilibrium and show the conditions of static equilibrium due to translational and rotational motion.</p> <p>Sample exercise task: A meter measuring rod is horizontal and in equilibrium when it is supported on the point at the 50 cm mark. When two 5 g coins were placed on the rod at 12 cm, the blade had to be moved to the 45.5 cm mark to keep the rod in balance. What is the mass of this rod?</p>											
Work placement	Not applicable											