

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Fizyka A5**  
 Name in English: **Physics A5**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable):  
 Level and form of studies: **1st level, full-time**  
 Kind of subject: **obligatory / university-wide**  
 Subject code: **FZP003069**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30	15			
Number of hours of total student workload (CNPS):	120	30			
Form of crediting:	examination	crediting with grade			
For group of courses mark (X) final course:					
Number of ECTS points:	4	1			
including number of ECTS points for practical (P) classes :		1			
including number of ECTS points for direct teacher-student contact (BK) classes:	2.80	0.70			

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. General knowledge and skills in Mathematics and Physics at a secondary school graduation level.

**SUBJECT OBJECTIVES**

- C1. Acquiring a basic knowledge, taking into account application aspects, of the following sections of the Classical Physics: Classical mechanics Oscillations and wave motion Thermodynamics
- C2. Acquiring basic skills to qualitative and quantitative understanding/interpretation of the selected phenomena/processes related to the sections of Physics specified above.
- C3. Gaining and strengthening social skills including creative thinking and acting, defining clearly priorities leading to the realization of tasks.

**SUBJECT LEARNING OUTCOMES***relating to knowledge:*

- PEU\_W01 Student has basic knowledge in classical mechanics, oscillations and wave motion, thermodynamics.
- PEU\_W02 Student knows the relationship of mathematics and physics with selected branches of engineering.

*relating to skills:*

- PEU\_U01 Student is able to apply correctly and efficiently the learned principles and laws of physics to analyze qualitatively and quantitatively selected aspects of engineering.
- PEU\_U02 Student is able to integrate the information, to interpret, to draw conclusions and to formulate and justify opinions.

*relating to social competences:*

- PEU\_K01 Student has skills to critical and objective analysis of the acquired information and rational justification of his/her own point of view, using the knowledge of physics.

## PROGRAMME CONTENT

Form of classes - lecture		Number of hours:
Lec 1	Organization and rules of the course. The methodology of physics, fundamental interactions.	2
Lec 2	Kinetics of Particles	2
Lec 3	Newton's Laws of Motion	2
Lec 4	Applications of the Newton's Laws of Motion	2
Lec 5	Work and energy. The mechanical energy conservation law	2
Lec 6	Systems of particles	2
Lec 7	Dynamics of rigid bodies.	2
Lec 8	Linear and angular momentum conservation laws.	2
Lec 9	Gravitation	2
Lec 10	Fluid mechanics	2
Lec 11	Periodic motion	2
Lec 12	Wave motion	2
Lec 13	Introduction to thermodynamics	2
Lec 14	Ideal gas	2
Lec 15	Elements of statistical physics	2
Total hours:		<b>30</b>

Form of classes - class		Number of hours:
Cl 1	Organization and rules. Solving exercises related to the dimensional analysis and estimating values of physical quantities	2
Cl 2	Application of the Newton's laws. Determination of the time dependence of the kinematic and dynamic quantities in inertial and non-inertial reference frames.	3
Cl 3	Practice in solving the selected problems using concepts of the mechanical work, the kinetic energy, the potential energy and the conservation law of the mechanical energy.	2
Cl 4	Quantitative and qualitative analysis of selected problems using the concept of center of mass and the momentum conservation law in the application of the system of material points, elastic and inelastic collisions.	2
Cl 5	Solving problems referring to the kinematics and dynamics of the circular motion of the rigid body and the conservation law of the angular momentum	2
Cl 6	The qualitative and quantitative analysis of the selected topics of the gravitational field concerning: a) determination of the gravitational forces, the field intensity, the gravitational energy and the potential; b) motion in the gravitational field using conservation and Kepler's laws	1
Cl 7	Analysis and solving problems related to the dynamic of periodic motion: simple harmonic (various pendulums, particles executing small oscillations around a stable equilibrium position), damped, forced and mechanical resonance. Solving problems related to the thermodynamics of an ideal gas.	2
Cl 8	Written test	1
Total hours:		<b>15</b>

## TEACHING TOOLS USED

- N1. Traditional lectures, multimedia presentations and demonstrations
- N2. Exercise classes – solving exercises and discussions, written tests
- N3. Self-education: preparation for exercises and exam
- N4. Consultations

## EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation <small>F – forming (during semester) P – concluding (at semester end)</small>	Educational effect number	Way of evaluating educational effect achievement
F1(W)	PEU_W01 PEU_W02	Examination
P(W)	P=F1	
F1(C)	PEU_U01 PEU_U02 PEU_K01	Oral answers
F2(C)	PEU_U01 PEU_U02 PEU_K01	discussions
F3(C)	PEU_U01 PEU_U02 PEU_K01	written tests
P(C)	P=0,2F1+0,1F2+0,7F3	

<b>PRIMARY AND SECONDARY LITERATURE</b>
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<b>PRIMARY LITERATURE:</b>
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| <p>[1] D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, tomy 1.2., Wydawnictwo Naukowe PWN, Warszawa 2003; J. Walker, Podstawy fizyki. Zbiór zadań, PWN, Warszawa 2005 i 2011.</p> <p>[2] W. Salejda, Fizyka a postęp cywilizacyjny (45,35 MB), Metodologia fizyki (1,1MB); opracowania dostępne, w zakładce Jednolite kursy fizyki, na stronie <a href="http://www.if.pwr.wroc.pl/index.php?menu=studia&amp;left_menu=jkf">http://www.if.pwr.wroc.pl/index.php?menu=studia&amp;left_menu=jkf</a></p> |
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<b>SECONDARY LITERATURE:</b>
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| <p>[1] R.P. Feynman, R.B. Leighton, M. Sanda, Feynmana wykłady z Fizyki, tom I część 1 i 2, PWN, Warszawa 1971.</p> <p>[2] J. Orear, Fizyka, tom 1. i 2., WNT, Warszawa 2008.</p> <p>[3] K. Sierański, K. Jezierski, B. Kołodka, Wzory i prawa z objaśnieniami, cz. 1. i 2., Oficyna Wydawnicza SCRIPTA, Wrocław 2005; K. Sierański, J. Szatkowski, Wzory i prawa z objaśnieniami, cz. 3., Oficyna Wydawnicza SCRIPTA, Wrocław 2008.</p> <p>[4] Witryna dydaktyczna Instytutu Fizyki PWR w zakładce Jednolite kursy fizyki znajdują się zalecane e-materiały dydaktyczne.</p> |
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<b>SUBJECT SUPERVISOR</b>
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