

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 EDUCATIONAL EFFECTS*relating to knowledge:*

- PEK_W01 Student has basic knowledge in classical mechanics, oscillations and wave motion, thermodynamics.
- PEK_W02 Student knows the relationship of mathematics and physics with selected branches of engineering.

relating to skills:

- PEK_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.
- PEK_U02 Student is able to integrate the information, to interpret, to draw conclusions and to formulate and justify opinions.

relating to social competences:

- PEK_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:		30

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:		15

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 EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation <small>F – forming (during semester) P – concluding (at semester end)</small>	Educational effect number	Way of evaluating educational effect achievement
F1(W)	PEK_W01 PEK_W02	Examination
P(W)	P=F1	
F1(C)	PEK_U01 PEK_U02 PEK_K01	Oral answers
F2(C)	PEK_U01 PEK_U02 PEK_K01	discussions
F3(C)	PEK_U01 PEK_U02 PEK_K01	written tests
P(C)	P=0,2F1+0,1F2+0,7F3	

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

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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 http://www.if.pwr.wroc.pl/index.php?menu=studia&left_menu=jkf</p> |
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SECONDARY LITERATURE:

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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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SUBJECT SUPERVISOR

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
FZP003069 - Physics A5
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_W01	K1ETK_W08	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.4
PEK_W02	K1ETK_W08	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.3 N.4
PEK_U01	K1ETK_U06	C.2	CI1 CI2 CI3 CI4 CI5 CI6 CI7 CI8	N.2 N.3 N.4
PEK_U02	K1ETK_U06	C.2	CI1 CI2 CI3 CI4 CI5 CI6 CI7 CI8	N.2 N.3 N.4
PEK_K01	K1ETK_K06	C.3	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15 CI1 CI2 CI3 CI4 CI5 CI6 CI7 CI8	N.2 N.3 N.4