

Faculty of Mechanical and Power Engineering
SUBJECT CARD

Name in Polish Fizyka 3
Name in English PHYSICS 3
Main field of study (if applicable): Power Engineering
Specialization (if applicable): All specialization
Level and form of studies: 1st-level, part-time
Kind of subject: obligatory
Subject code FZP002114
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	8		16		
Number of hours of total student workload (CNPS)	30		60		
Form of crediting	Examination / crediting with grade*		Examination / crediting with grade*		
For group of courses mark (X) final course					
Number of ECTS points	1		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	1		2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

A student of the course has a knowledge acquired from the first courses of Mathematical Analysis, Algebra and Physics 1 and Physics 2

SUBJECT OBJECTIVES

- C1. The purchase the basic knowledge, the taking into account her the application aspects, from the following sections of Modern Physics:
- C1.1. The Special Theory of Relativity
 - C1.2. Quantum Physics
 - C1.3. Fundamental of Solid State Physics
 - C1.4. Nuclear Physics
 - C1.5. Particle Physics and Astrophysics
- C2. The meeting of basic technics and the measuring methods of chosen of physical quantities
- C3. Conquest skill:
- C3.1. Facing and the executing in Physics Laboratory the experiences (LPF) depending on experimental verification of chosen say / the principles of physics and the measurement the physical quantities
 - C3.2. Study of results of measurements
 - C3.3. Estimating measuring uncertainties
 - C3.4. Study of written report with conducted measurements from utilization the usable software.
- C4, Understanding of basic phenomena and say the physical stepping out in energetics processes, using the nature in technics and in everyday life.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEK_W01 - a student has with range of special theory of relativity basic knowledge and her uses in relativistic kinematics and dynamics, in peculiarity in systems global positioning.

PEK_W02 - a student has knowledge connected with bases of quantum physics the, physics of atom, of physics of solid body as well as her chosen uses in activity; it knows the physical principles of working electronic the and telecommunicational devices the general use.

PEK_W03 - a student has the systematized knowledge about physics of atomic core as well as her uses, there is the knowledge about physics of elementary particles and astrophysics.

PEK_W04 - a student knows:

- a) the of BHP valid in Physics Laboratory principles,
- b) the method of executing the straight lines and the folded measurements of physical quantities,
- c) the method of study of results measurements, estimating the uncertainty of straight lines and the folded measurements
- d) helped the principle of executing written reporting the usable software (the editor of text, spreadsheet sheet, graphic programmes).

Relating to skills:

PEK_U01 - a student be able to: and) to apply the relating to interpretation of chosen of effects the special theory of relativity knowledge and relativistic phenomena, b) to motivate in systems the necessity of implementation of consequence special theory relativity global positioning (GPS)

PEK_U02 - a student has the skill of applying the knowledge about present physics (the physicist kwantowa, the physicist of atom, physicist of solid body) to: and) qualitative the and quantitative interpretation the chosen of phenomena and the effects of physics of atoms and the FCS which draw ahead in microscopic the and nanoskopowych scales of distance the b) the explaining the physical principles of working of chosen of semi-conductive devices

PEK_U03 - a student be able to: and) to the self - characterize and to introduce the concisely basic phenomena and the right of nuclear physics, b) to introduce the standard patternel of elementary particles, c) to the self - characterize in Universe the kinds of matter correctly as well as to introduce and to motivate the patternel the widening Universe

PEK_U04 - a student be able to: and) to execute, using to this the aim the appropriate attachments and the method, straight lines and the folded measurements of physical sizes, warning the principles of safety of work, b) to work out the results of measurements, to conduct the analysis of measuring uncertainties as well as to draw up reporting / the report with executed measurements in LPF from utilization the knowledge and the appropriate usable software.

Relating to social competences:

PEK_K01 -a student reason: a) the need of learning by whole life and the improvement of skill of broadening / the logging of knowledge, b) the influence of discoveries and the achievements of physics on civilization development; it be able to inspire and to organize process of learning different persons.

PEK_K02 - a student be able to: a) to co-operate and to work in group, accepting in her different parts, also managerial, b) to apply to work own skills in group or severally

PEK_K03 - a student be able to think and to act in creative way as well as to define priorities the servants of realization definite task.

PROGRAMME CONTENT

Form of classes – lecture		Number of hours
Lec.1.	The Special Theory of Relativity	2
Lec. 2	Quantum Physics: Selected Topics	3
Lec. 3.	Nuclear Physics: Selected Topics	3
Total hours		8

Form of classes – physics laboratory		Number of hours
Lab. 1	Introduction to LPP: the matter of organization and the course of occupations the, introduction the students: and) with principles the safe executing the measurements the (short training with range of BHP), b) with principles of written study of reporting, c) with bases of analysis of measuring uncertainties..	3
Lab.2	The realization of measurements for help of analog measures and digital the electric arrangement. The statistical study of received results of measurements of straight lines and folded, the estimating the uncertainty of measurements of straight lines and folded, the graphic introduction of results of measurements and the measuring uncertainties, study of reporting.	3
Lab.3 Lab.4	The realization of measurements of chosen mechanical sizes the, thermodynamical, electromechanical, optical or quantum the as well as study reporting	9
Lab.5	Credit of occupations	1
Total hours		16

TEACHING TOOLS USED

- N1. Traditional lectures aided with transparencies, slides presentations and demonstrations of physical laws and phenomena.
 N2. Own work - preparation to practices laboratory
 N3. The laboratory practice - the discussion of ways of realization measurements, study of results as well as the estimating the measuring uncertainties, opinion of reporting / the reports
 N4. Laboratory practice - written strickle previous measurements
 N5. The own work - the independent realization of measurements
 N6. Own work - independent studies and preparation to examination
 N7. Consultations

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_U04	The oral answers the, discussions, written strickle, opinion of every reporting
F2	PEK_W01 – PEK_W03	The written exam

$$C = F2$$

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] D. Halliday, R. Resnick, J. Walker: *Podstawy Fizyki*, tomy 1-2, 4, Wydawnictwa Naukowe PWN, Warszawa 2003.
- [2] I.W. Sawieliew, *Wykłady z fizyki*, tom 1. i 2., Wydawnictwa Naukowe PWN, Warszawa, 2003
- [3] Ćwiczenia Laboratoryjne z Fizyki, Tomy 1-4, Oficyna Wydawnicza Politechniki Wrocławskiej (dostępne wraz z instrukcjami roboczymi na stronie <http://www.if.pwr.wroc.pl/lpf>)

SECONDARY LITERATURE:

- [1] J. Massalski, M. Massalska, *Fizyka dla inżynierów*, cz. 1. i 2., WNT, Warszawa 2008.
- [2] J. Orear, *Fizyka*, WNT, Warszawa 1990.
- [3] C. Bobrowski, *Fizyka - krótki kurs*, WNT, Warszawa 1995
- [4] Witryna dydaktyczna Instytutu Fizyki PWr <http://www.if.pwr.wroc.pl/dydaktyka>. zawiera materiały dydaktyczne

OPIEKUN PRZEDMIOTU (IMIĘ, NAZWISKO, ADRES E-MAIL)

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Physics 3 AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Power Engineering (all specializations)

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	K1ENG_W03	C1, C4	Lect.1	N1, N7
PEK_W02	K1ENG_W03	C1, C4	Lect.2	N1, N7
PEK_W03	K1ENG_W03	C1, C4	Lect.3	N1, N7
PEK_W04	K1ENG_W05	C1, C4	Lab.1 – Lab.5	N2 – N7
PEK_U01	K1ENG_U01, K1ENG_U03	C2, C3, C4	Lect.1	N1, N7
PEK_U02	K1ENG_U01, K1ENG_U03	C2, C3, C4	Lect.2	N1, N7
PEK_U03	K1ENG_U01, K1ENG_U03	C2, C3, C4	Lect.3	N1, N7
PEK_U04	K1ENG_U02, K1ENG_U03 K1ENG_U04, K1ENG_U09 K1ENG_U11, K1ENG_U12	C2, C3, C4	Lab.1 – Lab.5	N2 – N7
PEK_K01	K1ENG_K01 – K1ENG_K04	C1 – C4	Lab.1 – Lab.5	N2 – N7
PEK_K02	K1ENG_K01 – K1ENG_K04	C1 – C4	Lab.1 – Lab.5	N2 – N7
PEK_K03	K1ENG_K01 – K1ENG_K04	C1 – C4	Lab.1 – Lab.5	N2 – N7

** - enter symbols for main-field-of-study/specialization educational effects

*** - from table above