

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Fizyka G5**
 Name in English: **Physics G5**
 Main field of study (if applicable): **Control Engineering and Robotics**
 Specialization (if applicable):
 Level and form of studies: **1st level, full-time**
 Kind of subject: **obligatory / university-wide**
 Subject code: **FZP003068**
 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. Student is able to analyze problems and find solutions using methods of mathematical analysis and linear algebra.
2. Students has knowledge and skills in Classical Mechanics and Thermodynamics defined by educational effects of Physics A5.

SUBJECT OBJECTIVES

- C1. Acquiring a basic knowledge, taking into account application aspects, of the selected sections of the Classical Electrodynamics
 C2. Acquiring a basic knowledge, taking into account application aspects, of the selected sections of the Modern Physics
 C3. Acquiring a basic knowledge on the typical techniques and methods of the selected physical quantities measurement
 C4. Acquiring basic abilities of planning and performing experiments in the Physics Laboratory
 C5. Gaining and strengthening social skills defined by the subject educational effects

SUBJECT EDUCATIONAL EFFECTS*relating to knowledge:*

- PEK_W01 Student has basic knowledge in the Classical Electrodynamics and selected subjects of the Modern Physics
 PEK_W02 Student knows and understands the importance of discoveries and achievements of the Classical Electrodynamics and the Modern Physics for technical sciences and the progress of civilization.

relating to skills:

- PEK_U01 Student is able to present alone, correctly and concisely, in oral or written form topics discussed during lectures.
 PEK_U02 Student is able to plan and perform experiment - to measure, to analyze and to describe obtained results, to estimate the measurement uncertainties.

relating to social competences:

- PEK_K01 Gaining and strengthening social skills related to the teamwork, responsibility and honesty in gaining the knowledge.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours:
Lec 1	Organization and rules of the course. Mathematical basis of the vector fields.	2
Lec 2	Electrostatics	2
Lec 3	Electric Current	2
Lec 4	Magnetic fields	2
Lec 5	Magnetic Fields Due to Currents	2
Lec 6	Maxwell's equations	2
Lec 7	Electromagnetic waves	2
Lec 8	Fundamentals of wave optics	2
Lec 9	Elements of the special theory of relativity, Global Positioning System	2
Lec 10	Introduction to quantum physics, matter waves	2
Lec 11	Atomic structure	2
Lec 12	Applications of quantum physics in medicine and more	2
Lec 13	Fundamentals of the solid state physics	2
Lec 14	Elements of the nuclear physics	2
Lec 15	Selected problems of particle physics and astrophysics	2
Total hours:		30

Form of classes - laboratory		Number of hours:
Lab 1	Organization and rules of the evaluation. Acquainting students with a) the safety rules (a short health and safety training) and the laboratory regulations, b) requirements regarding the preparation of the written reports, c) the foundations of measurement uncertainties analysis. Simple physical measurements.	2
Lab 2	Measurements with an electric circuits using analogue and digital instruments. Statistical analysis of obtained results of simple and complex measurements, estimation of the measurement uncertainties, graphical presentation of the results, preparation of the report	2
Lab 3	Measurements of selected mechanical quantities, preparation of the report	2
Lab 4	Measurements of selected thermodynamical quantities, preparation of the report	2
Lab 5	Measurements of selected electromechanical quantities, preparation of the report	2
Lab 6	Measurements of selected optical or quantum quantities, preparation of the report	2
Lab 7	The supplementary classes in the Laboratory	2
Lab 8	Credits	1
Total hours:		15

TEACHING TOOLS USED

- N1. Traditional lectures, multimedia presentations and demonstrations
- N2. Laboratory classes – discussions, analysis of the experimental results and the estimation of measurement uncertainty, evaluation of written reports, short written tests
- N3. Self-education: preparation for Laboratory classes and exam
- N4. Consultations

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(W)	PEK_W01 PEK_W02	Examination
P(W)	P=F1	
F1(L)	PEK_U01 PEK_U02 PEK_K01	Checking the preparation for classes
F2(L)	PEK_U01 PEK_U02 PEK_K01	Evaluation of reports
P(L)	P=0,2F1+0,8F2	

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] D. Halliday, R. Resnick, J. Walker, Podstawy fizyki, tomy 3,4,5, Wydawnictwo Naukowe PWN, Warszawa 2003; J. Walker, Podstawy fizyki. Zbiór zadań, PWN, Warszawa 2005 i 2011.
- [2] Paul A. Tipler, Ralph A. Llewellyn, Fizyka współczesna, Wydawnictwo Naukowe PWN, Warszawa 2012.
- [3] R. Poprawski, W. Salejda, Ćwiczenia laboratoryjne z fizyki, Cz. I-IV, Oficyna Wydawnicza PWR; wersja elektroniczna 5. wydania cz. 1. dostępna po kliknięciu nazwy Zasady opracowania wyników pomiarów z witryny Dolnośląskiej Biblioteki Cyfrowej; wersje elektroniczne pozostałych części podręcznika dostępne na stronie internetowej LPF pod adresem <http://www.if.pwr.wroc.pl/LPF>, gdzie znajdują się: regulamin LPF i regulamin BHP, spis ćwiczeń, opisy ćwiczeń, instrukcje
- [4] 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

SECONDARY LITERATURE:

- [1] R.P. Feynman, R.B. Leighton, M. Sanda, Feynmana wykłady z Fizyki, tom II część 1 i 2, PWN, Warszawa 1971.
- [2] J. Orear, Fizyka, tom 1. i 2., WNT, Warszawa 2008.
- [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.
- [4] Witryna dydaktyczna Instytutu Fizyki PWR w zakładce Jednolite kursy fizyki znajdują się zalecane e-materiały dydaktyczne.

SUBJECT SUPERVISOR

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT FZP003068 - Physics G5 AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Control Engineering and Robotics

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	K1AiR_W07	C.1 C.2	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.3 N.4
PEK_W02	K1AiR_W07	C.1 C.2	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.3 N.4
PEK_U01	K1AiR_U04 K1AiR_U05	C.3 C.4	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7	N.2 N.3 N.4
PEK_U02	K1AiR_U04 K1AiR_U05	C.3 C.4	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7	N.2 N.3 N.4
PEK_K01	K1AiR_K09	C.5	Lab1 Lab2 Lab3 Lab4 Lab5 Lab6 Lab7	N.2 N.3 N.4