

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Fizyka G5**  
 Name in English: **Physics G5**  
 Main field of study (if applicable): **Industrial Control Engineering**  
 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 LEARNING OUTCOMES***relating to knowledge:*

- PEU\_W01 Student has basic knowledge in the Classical Electrodynamics and selected subjects of the Modern Physics  
 PEU\_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:*

- PEU\_U01 Student is able to present alone, correctly and concisely, in oral or written form topics discussed during lectures.  
 PEU\_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:*

- PEU\_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:		<b>30</b>

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:		<b>15</b>

### 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 LEARNING OUTCOMES ACHIEVEMENT

Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(W)	PEU_W01 PEU_W02	Examination
P(W)	P=F1	
F1(L)	PEU_U01 PEU_U02 PEU_K01	Checking the preparation for classes
F2(L)	PEU_U01 PEU_U02 PEU_K01	Evaluation of reports
P(L)	P=0,2F1+0,8F2	

<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 3,4,5, Wydawnictwo Naukowe PWN, Warszawa 2003; J. Walker, Podstawy fizyki. Zbiór zadań, PWN, Warszawa 2005 i 2011.</p> <p>[2] Paul A. Tipler, Ralph A. Llewellyn, Fizyka współczesna, Wydawnictwo Naukowe PWN, Warszawa 2012.</p> <p>[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 <a href="http://www.if.pwr.wroc.pl/LPF">http://www.if.pwr.wroc.pl/LPF</a>, gdzie znajdują się: regulamin LPF i regulamin BHP, spis ćwiczeń, opisy ćwiczeń, instrukcje</p> <p>[4] 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 II 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-materiał dydaktyczne.</p> |
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<b>SUBJECT SUPERVISOR</b>
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