

FACULTY of Mechanical and Power Engineering
SUBJECT CARD

Name in Polish Fizyka 2

Name in English PHYSICS 2

Main field of study (if applicable): The Power Engineering

Specialization (if applicable): All specialization

Level and form of studies: 1st-level, part-time

Kind of subject: obligatory / ~~optional~~ / ~~university-wide~~*

Subject code FZP 2107

Group of courses ~~YES~~ / NO*

| | Lecture | Classes | Labs | Project | Seminar |
|---|---|--|------|---------|---------|
| Number of hours of organized classes in University (ZZU) | 16 | 8 | | | |
| Number of hours of total student workload (CNPS) | 60 | 60 | | | |
| Form of crediting | Examination / crediting with grade* | Examination / crediting with grade* | | | |
| For group of courses mark (X) final course | | | | | |
| Number of ECTS points | 5 | 2 | | | |
| including number of ECTS points for practical (P) classes | 0 | 0 | | | |
| including number of ECTS points for direct teacher-student contact (BK) classes | 2 | 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.

SUBJECT OBJECTIVES

C1. Acquiring a basic knowledge, taking into account application aspects, of the following sections of the Classical Physics:

- C1.1. Electrostatic
- C1.2. Electric DC
- C1.3. Magnetostatics
- C1.4. Electric AC
- C1.5. The electromagnetic waves
- C1.6. Optics
- C1.7. Optical waves

C2. Acquiring basic desirable skills concerning the qualitative understanding/interpretation of the selected phenomenon/processes and the quantitative analysis and solutions of the problems/exercises connected with the above specified sections of Physics.

C3. Gaining and strengthening social skills including understanding the necessity of a lifetime learning process and abilities: (a) to inspire and organize the process of learning for others, (b) to cooperate and work in a team, (c) to think and act in a creative way, (d) to set clear priorities leading to the realization of tasks.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEK_W01 - a student has the basic knowledge about properties homogeneous and central electrostatic field, methods their quantitative description as well as the movement of charges in such fields.

PEK_W02 - a student has the grounded knowledge about electric current and principles of its flow. It knows to draw and to interpret straight lines the circuits of electric current.

PEK_W03 - a student knows the notion of magnetic field and reason its formation. Charged particles from magnetic field my knowledge on subject of influence of particles.

PEK_W04 - a student has strengthened knowledge connected from circuits of changing current. It knows and the reason the notion of electromagnetic induction.

PEK_W05 - a student possesses with range the knowledge the production and the detection of electromagnetic waves as well as about methods of use this knowledge to analysis of questions about engineering character.

PEK_W06 - a student knows and the reason of ray of geometrical optics. It be able to draw and to analyse in straight lines the gear of light ray optical attachments.

PEK_W07 - a student possesses with range of wave optics the knowledge and her uses, it knows the basis of diffraction, interference and the diffraction of blank space. It be able to apply to analysis of questions character this knowledge.

Relating to skills:

PEK_U01 - a student be able to writing, or in oral statement, correctly and to introduce question the being the content of objective effects of education PEK_W01 concisely-PEK_W07.

PEK_U02 - a student be able to qualitatively and to analyse homogeneous and central electric field.

PEK_U03 - a student be able to formulate and to solve the simple equations of movement of particle charged in electric field.

PEK_U04 - a student be able to analyse and to solve straight lines the circuits of DC.

PEK_U05 - a student be able to recognize the source of magnetic field and to apply to description suitable formulae their propriety

PEK_U06 - a student be able to qualitatively as well as to characterize the influence mutual the currents ilościowo as well as the influence from magnetic field of moving particles

PEK_U07 - a student has the skill of analysing and solving tasks and connected with electromagnetic induction problems.

PEK_U08 - a student knows to construct the gear of light ray in case of straight lines of optical attachments as well as to apply to quantitative description the suitable formulae these cases.

PEK_U09 - a student knows to qualify effects connected with wave nature radiation electromagnetic.

Relating to social competences:

PEK_K01 – understands: (a) the necessity of a lifetime self-learning process and an improvement in skills in the knowledge enhancement, (b) an influence of discoveries and achievements in Physics onto the civilization progress; is able to inspire and organize the process of learning for others.

PEK_K02 – is able to cooperate and work in a team, taking different roles including the leader role; has an ability to use own skills, to work in a group or alone.

K_K03 – is able to think and act in a creative way and to set clear priorities leading to the realization of tasks.

PROGRAMME CONTENT

| Form of classes - lecture | | Number of hours |
|---------------------------|---|-----------------|
| Lect. 1 | Electrostatic. | 2 |
| Lect. 2 | Electric direct current (DC). | 2 |
| Lect. 3 | Magnetic fields. | 2 |
| Lect. 4 | The electromagnetic induction. | 2 |
| Lect. 5 | Movement of particles in magnetical field | 2 |
| Lect. 6. | Electric alternating current (AC) | 2 |
| Lect. 7 | Basic rights of geometrical optics | 2 |
| Lect. 8 | The polarization, interference and the diffraction of electromagnetic wave: | 2 |
| Total hours | | 16 |

| Form of classes - class | | Number of hours |
|-------------------------|--|-----------------|
| Cl 1 | Analysing and the solving the chosen of tasks and the problems with range of electric field, the movement of cargos in this field as well as the circuits of electric current.. | 2 |
| Cl. 2 | The analysis and the solving the relating the magnetical field tasks, in peculiarity of different sources this field as well as the movement of particles in magnetical field as well as the interaction of electric currents. | 2 |
| Cl. 3 | Analysing and connected the solving the tasks with phenomenon of electromagnetic induction as well as with changing current. | 2 |
| Cl. 4 | Constructing in case of straight lines of optical attachments the gear of light ray. Quantitative analysis of received paintings. Solving the tasks of relating basic proprieties of electromagnetic waves. | 2 |
| Total hours | | 8 |

TEACHING TOOLS USED

N1. Traditional lectures aided with transparencies, slides presentations and demonstrations of physical laws and phenomena.

N2. Student's own work – individual studies and preparation of own exercises solutions or problems.

- N3. Activity on occupations.
 N4. own Work - independent studies and preparation to examination.
 N5. 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_U01-PEK_U09; PEK_K01-PEK_K03 | The oral statements, the presentation own solution during classes, written short tests, e-tests, portfolio |
| F2 | PEK_W01-PEK_W07; PEK_K01-PEK_K03 | 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] [J. Walker, *Podstawy fizyki. Zbiór zadań*, PWN, Warszawa 2005 i 2011](#)
 [4] Zbiór e-zadań dostępnych on-line na stronie Działu Kształcenia na Odległość PWr <http://www.dko.pwr.wroc.pl/>

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] K. Sierański, J. Szatkowski *Fizyka. Wzory i Prawa z Objasnieniami* cz. III, Scripta 2008
 [5] Witryna dydaktyczna Instytutu Fizyki PWr <http://www.if.pwr.wroc.pl/dydaktyka/> zawierająca materiały dydaktyczne

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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**MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT *Physics 2*
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, K1ENG_W06 | C1, C3 | Lect.1 | N1, N4, N5 |
| PEK_W02 | K1ENG_W03, K1ENG_W06 | C1, C3 | Lect.2 | N1, N4, N5 |
| PEK_W03 | K1ENG_W03, K1ENG_W06 | C1, C3 | Lect.3 | N1, N4, N5 |
| PEK_W04 | K1ENG_W03, K1ENG_W06 | C1, C3 | Lect.4 Lect.5 | N1, N4, N5 |
| PEK_W05 | K1ENG_W03, K1ENG_W06 | C1, C3 | Lect.4 Lect.5 Lect.8 | N1, N4, N5 |
| PEK_W06 | K1ENG_W03, K1ENG_W06 | C1, C3 | Lect.7 | N1, N4, N5 |
| PEK_W07 | K1ENG_W03, K1ENG_W06 | C1, C3 | Lect.8 | N1, N4, N5 |
| PEK_U01 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.1 – Cl.4 | N2, N3, N5 |
| PEK_U02 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.1 | N2, N3, N5 |
| PEK_U03 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.1 | N2, N3, N5 |
| PEK_U04 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.1 | N2, N3, N5 |
| PEK_U05 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.2 | N2, N3, N5 |
| PEK_U06 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.2 | N2, N3, N5 |
| PEK_U07 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.3 | N2, N3, N5 |
| PEK_U08 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.4 | N2, N3, N5 |
| PEK_U09 | K1ENG_U01, K1ENG_U03, K1ENG_U09, K1ENG_U22 | C2, C3 | Cl.4 | N2, N3, N5 |
| PEK_K01 | K1ENG_K01, K1ENG_K02, K1ENG_K03 | C1, C2, C3 | Lect.1 – Lect. 8 Cl.1 – Cl.4 | N1, N2, N3, N4,N5 |
| PEK_K02 | K1ENG_K01, K1ENG_K02, K1ENG_K03 | C1, C2, C3 | Lect.1 – Lect. 8 Cl.1 – Cl.4 | N1, N2, N3, N4,N5 |
| PEK_K03 | K1ENG_K01, K1ENG_K02, K1ENG_K03 | C1, C2, C3 | Lect.1 – Lect. 8 Cl.1 – Cl.4 | N1, N2, N3, N4,N5 |