KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
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FUNDUSZ SPOŁECZNY

Course title	ECTS code
Physics II	13.3.0730

Name of unit administrating study

Faculty of Mathematics, Physics and Informatics

Studies

faculty	field of study		
Faculty of Chemistry	Chemical Business	type	all
		form	all
		specialty	all
		specialization	all

Teaching staff

dr Karol Szczodrowski; dr hab. Marek Józefowicz; mgr Natalia Górecka; mgr Natalia Majewska; mgr Agata Lazarowska; dr Maria Alicka; dr Illia Serdiuk; prof. UG, dr hab. Sebastian Mahlik

Forms of classes, the realization and number of hours

Forms of classes

Laboratory classes, Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 15 hours, Laboratory classes: 30 hours

ECTS credits

4
classes - 45 h
tutorial classes – 10 h
student's own work – 45 h

Total: 100 h - 4 ECTS

The academic cycle

2022/2023 summer semester

Type of course

obligatory

Language of instruction

polish

Teaching methods

- conducting experiments
- multimedia-based lecture

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

- Graded credit
- Examination

Assessment methods

- written exam with open questions
- Assessment methods

written exam

The basic criteria for evaluation

The basic criteria for evaluation or exam requirements
10 open questions covering issues in the subject curriculum contents; answers to the questions will require solving
Laboratory exercises
Positive evaluation of 5 entrance collections covering the subject of performed experiments as part of laboratory exercises, implementation of all experiments provided for in the program of classes (the quality of laboratory work, the way of conducting experiments as well as the ability to cooperate in a group will be evaluated) and analysis of obtained results in the form of a written report
• each negative assessment should be corrected. It is a prerequisite for passing the exercises

Method of verifying required learning outcomes

Required courses and introductory requirements

A. Formal requirements
none

B. Prerequisites

Required courses and introductory requirements

Basic knowledge of physics in the field of physics lecture for chemistry students, basic knowledge of mathematical analysis in the application of differential and integral calculus

Aims of education

- acquainting students with all issues mentioned in the lecture's program content,
- acquainting students with the basics of quantum physics
- familiarize students with the basic models describing the energy structure of atoms, polyatomic particles and solids (crystals)
- teaching independent students (using descriptions included in the instructions) to conduct physical experiments
- to develop the skills of critical evaluation and interpretation of the obtained experimental results and analysis of source texts

Course contents

Course contents

Wave-particle dualism and the basics of quantum physics, first quantization. Bosons and fermions, statistics by Fermi -Dirack and Bose Einstein. Hamilton operator, free electrons, density of states. Particle in the potential well, single-electrode atom, multi-electrode atom. Quantum numbers. Electronic transitions with emission and photon absorption. Molecules (electron spectra, oscillatory and rotational spectra). Structure of the crystal band. Measurements of the properties of atoms, molecules and crystals - optical and X-ray spectroscopy

Bibliography of literature

Bibliography of literature

Literature required to pass the course

D. Holliday, R. Resnic , J. walker Podstawy Fizyki t. 5

Z. Leś Podstawy Fizyki atomu,

Extracurricular readings

R. Feynman, R. B. Leighton, M. Sands, Feynmana wykłady z fizyki, t. 3

C. Kittel , Wstęp do fizyki ciała stałego

The learning outcomes (for the field of study and specialization)

Knowledge

Knowledge

Understanding the wave nature of particles and the resulting consequences

Knowledge of the structure of single-electron and multi-electrode atoms

Knowledge of the energy structure of molecules and crystals

Knowledge of the basic equipment for spectral measurements and X-ray diffraction

Skills

Skills

Using the concepts of quantum physics to describe the atoms of molecules and electrons.

Knowledge of the basic energy structure of atoms, molecules and solids

Ability to interpret spectra of absorption and luminescence.

Social competence

Social competence

1. understanding the need for continuous education,
2. care for entrusted laboratory equipment
3. to exercise due care in the use of laboratory equipment and in the work with chemical reagents
4. ability to work in a team according to their role in it (group manager / group member)
5. awareness of the need for a critical analysis of own work
6. cautious criticism in receiving information, especially available in the mass media
7. awareness of the need for honest and reliable work

Contact

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