UNIWERSYTET GDAŃSKI

Course title Fizyka II / Physics II	**ECTS code** 13.3.0730

Name of unit administrating study
Faculty of Chemistry

Studies

Field of study	Type	Form	
Chemical business	Bachelor / Engineer	Full-time studies	

Teaching staff
Prof. dr hab. Marek Grinberg

Forms of classes, the realization and number of hours

A. Forms of classes, in accordance with the UG Rector's regulations
lecture, laboratory classes

B. The realization of activities
in-class learning

C. Number of hours
45 h (15 h lecture, 30 h laboratory classes)

ECTS credits 4

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

Total: 100 h - 4 ECTS

The academic cycle
First year, summer semester

Type of course
obligatory

Language of instruction
Polish

Teaching methods

Lecture with multimedia presentation
Performing experiments

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

A. Final evaluation, in accordance with the UG study regulations
lecture – exam
laboratory classes – course completion (with a grade)

B. Assessment methods
written exam

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

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

• 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

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

A. Literature required to pass the course

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

B. Extracurricular readings

R. Feynman, R. B. Leighton, M. Sands, Feynmana wykłady z fizyki, t. 3
C. Kittel , Wstęp do fizyki ciała stałego

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

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

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