Syllabus of the educational discipline
«PHYSICS»

Cycle of Higher Education	*First cycle of higher education (Bachelor's degree)*
Field of Study	*F Information Technologies*
Specialty	*F7 Computer engineering*
Educational program	*Computer systems and networks*
Discipline status	*Normative*
Teaching language	*English*
Year of studies, semester	*1 year (2 semester)*
Number of credits ECTS	*6 credits*
Distribution by types of trainings and hours of study	*Lectures, Laboratory studies, Practice studies, Independent training*
Form of final assessment	*Exam*
Teacher	*Chichura Igor Ivanovich, Senior lecturer of the department of Instrument Engineering*
Teacher's contacts	*igor.chechura@uzhnu.edu.ua*
Course Schedule	*According to the timetable*

The purpose of studying the discipline "PHYSICS" is to give students knowledge and understanding of the basic physical phenomena in nature, to teach them the basic laws, formulas, equations and laws, principles and relationships in the field of classical and modern physics, to give students the normative base of natural scientific knowledge and skills necessary for deep learning of modern engineering, technological disciplines of professional and practical training

As a result of studying the discipline the student must:

know:

- basic physical phenomena, physical definitions, dependencies, functions, laws, formulas, equations, relations, characteristics, parameters, physical units, installations, instruments, devices, charts, graphs, structure, structure, connections, formulated examples, problems, posed questions, according to the content modules.

be able to:

- apply basic fundamental knowledge, laws, formulas, equations, settings, instruments, devices to set, study, solve, theoretical and practical examples and problems;
- make measurements or investigations of certain tasks, analyze measurement results, errors, build tables, graphs, functions, synthesize conclusions, models, schemes and evaluate the appropriateness, effectiveness, necessity, complexity.

Prerequisites for learning

Mathematical Analysis, Linear Algebra and Analytic Geometry

Content of the educational discipline

Module 1

Content module 1. Mechanics.

Topic 1. Kinematic equations of motion.
Topic 2. Newton's Laws
Topic 3. Body Impulse
Topic 4. Moment of inertia.
Topic 5. Fluid mechanics.

Content module 2. Molecular Physics and Thermodynamics

Topic 6. Experimental gas laws of ideal gas.
Topic 7. Velocity distribution of ideal gas molecules.
Topic 8. Diffusion in gases
Topic 9. Internal energy of gas
Topic 10. Real Gases
Topic 11. General properties and structure of liquids

Content module 3. Electricity and Magnetism.

Topic 12. Coulomb's law
Topic 13. Work of electrostatic field forces.
Topic 14. Electrical capacity.
Topic 15. Electric power.
Topic 16. Magnetic flux
Module 2
Content module 4. Fluctuations and waves. Wave energy. Energy and light quantities
Topic 1. Mechanical vibrations. Adding vibrations
Topic 2. Mechanical elastic waves. Sound waves. General characteristics of waves. Acoustics.
Topic 3. Electromagnetic oscillations, electromagnetic waves. Light
Topic 4. Photometry
Topic 5. Photometry
Content module 5. Optics
Topic 6. Geometric (ray) optics
Topic 7. Interference of light
Topic 8. Light diffraction
Topic 9. Polarization of light
Topic 10. Polarization of light
Topic 11. Dispersion and light absorption
Topic 12. Thermal radiation
Topic 13. The photoelectric effect
Content module 6. Elements of physics of the atom, the atomic nucleus, quantum mechanics, and solids
Topic 14. Model of the atom.
Topic 15. Planetary model of the hydrogen atom
Topic 16. The Elements of Quantum Mechanics
Topic 17. Atoms, molecules, and solids

Course page on the Moodle platform (personal training system)	*Syllabus of the educational discipline, hyperlinks to electronic publications of the discipline, recommended literature, students' attendance, lecture materials, presentations, questions for self-control, methodical materials for laboratory works, tests, tasks for checking students' knowledge.* *https://moodle.uzhnu.edu.ua*

Recommended literature

1. *Burns G. Solid State Physics, Academic Press, 1985, - 755p*
2. *Gregory R.D. ,Classical Mechanics. - Cambridge University Press, 2006, 590p.*
3. *Stephen T. Thornton Modern Physics for Scientists and Engineers, 4th Edition. - Cengage Learning, 2013, - 688p*
4. *Kenneth S. Krane Modern Physics 3rd Edition. – Wiley, 2012,- 560p.*

Assessment system of learning outcomes

The working program for the discipline "Physics", which is studied in the first year (2 semesters), is divided into two modules.

To control each module developed a list of theoretical questions, usual problems, examples, laboratory work, problems for independent work (calculation work), with the content of which students are familiarized at the beginning of the semester. Each module is assessed a maximum of 100 points, which is the arithmetic mean of 100 points from the "theory module", plus 100 points from the "practical module" (preparation for the practical, answering questions, solving problems independently and in class, current control), plus 100 points from the laboratory module on performance of laboratory works (admission, execution, design and protection of laboratory works, current control).

ECTS and national grading scale

Mark scale	ECTS	Exam	Test
90 - 100	A	Excellent	Satisfied

82 - 89	B	Good	
74 - 81	C		
64 - 73	D	Satisfactory	
60 - 63	E		
35 - 59	FX	“Unsatisfactory” with possibility to pass the exam again	“Not satisfied” with possibility to pass the exam again
1 - 34	F	“Unsatisfactory” with obligatory repeated study of the discipline	“Not satisfied” with obligatory repeated study of the discipline