

SYLLABUS
in the discipline "Physics"
for students of the first (bachelor's) level of higher education
specialty G20 Publishing and Printing
educational and professional program Publishing and Printing

1.	Name of the faculty	Faculty of Computer Science
2.	Level of higher education	bachelor
3.	Code and name of the specialty	G20 Publishing and Printing
4.	Type and name of educational program	Publishing and Printing
5.	Code and name of the discipline	Physics
6.	Number of ECTS credits	6
7.	Discipline structure (distribution by types and hours of study)	1st semester 90 hours, of which: lectures 20 hours, practical 10 hours, laboratory 12 hours, consultations 6 hours, independent work 42 hours. 2nd semester 90 hours, of which: lectures 20 hours, practical 8 hours, laboratory 8 hours, consultations 8 hours, independent work 46 hours.
8.	The schedule of studying the discipline	1 course, 1,2 semesters
9.	Prerequisites for studying the discipline	Knowledge of the main sections of higher mathematics, in particular linear and vector algebra, differential and integral calculus
10.	Discipline abstract	Content module 1. Mechanics Topic 1. Kinematics Topic 2. Dynamics of translational motion. Topic 3. Work and energy. Topic 4. Dynamics of rotational motion. Topic 5. Mechanical oscillations. Content module 2. Electromagnetism Topic 6. Electric field in vacuum. Topic 7. Electric field in dielectrics and conductors. Topic 8. Direct current. Topic 9. Magnetic field in vacuum. Topic 10. Magnetic field in matter.

		<p>Content module 3. Electromagnetic oscillations and alternating current</p> <p>Topic 11. Electromagnetic induction.</p> <p>Topic 12. Electromagnetic oscillations.</p> <p>Topic 13 Alternating current.</p> <p>Topic 14. Electromagnetic waves.</p> <p>Content module 4. Wave optics. Physical foundations of light</p> <p>Topic 15. Geometric optics</p> <p>Topic 16. Interference. Diffraction.</p> <p>Topic 17. Polarization.</p> <p>Topic 18. Physical nature of radiation and its characteristics.</p> <p>Topic 19. Conversion of radiation by optical media.</p> <p>Dispersion.</p> <p>Topic 20. Receivers of optical radiation. Light sources.</p>
11.	Competences, knowledge, skills, understanding, which is acquired by the applicant in higher education in the learning process	<p>General competencies (GC):</p> <p>GC-1. Ability to learn and master modern knowledge.</p> <p>GC-2. Knowledge and understanding of the subject area and understanding of professional activity.</p> <p>GC-3. Ability to apply knowledge in practical situations.</p> <p>GC-4. Ability to make informed decisions.</p> <p>GC-5. Ability to communicate with representatives of other professional groups of different levels (with experts from other fields of knowledge/types of economic activity).</p> <p>GC-6. Implementation of safe activities.</p> <p>GC-7. Ability to work autonomously.</p> <p>GC-8. Ability to work in a team.</p> <p>GC-9. Ability to exercise one's rights and obligations as a member of society, to realize the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of man and citizen in Ukraine.</p> <p>GC-10. The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technology, to use various types and forms of physical activity for active recreation and leading a healthy lifestyle.</p> <p>GC -11. The ability to make decisions and act, adhering to the principle of inadmissibility of corruption and any other manifestations of dishonesty.</p> <p>Professional competencies of the specialty (SK):</p>

	<p>SK-1. The ability to make informed decisions regarding the processes inherent in all stages of the production of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products.</p> <p>SK-2. The ability to apply appropriate mathematical and technical methods and computer software to solve engineering problems in publishing and printing.</p> <p>SK-3. Ability to apply the principles of processing, registration, formation, reproduction, storage of text, graphic, sound and video information and the features of its use for the production of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products.</p> <p>SK-4. Ability to make the optimal choice of technologies, materials, equipment, hardware and software, methods and control tools for designing the technological process of manufacturing printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products.</p> <p>SK-5. Ability to design the structure, construction and design of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products, using modern software and hardware, taking into account the requirements for the result, available resources and limitations.</p> <p>SK-6. The ability to take into account social, environmental, ethical, economic, legal and commercial factors that influence the implementation of technical solutions in publishing and printing.</p> <p>SK-7. The ability to make effective technical and economic decisions regarding the implementation of a specific project of publishing and printing activities within the framework of the enterprise's publishing and production plans; development of regulatory and technical documentation for the production process of products.</p> <p>SK-8. The ability to plan and organize production, operation, maintenance, distribution of products in publishing and printing, taking into account the specifics of the problem being solved.</p> <p>SK-9. The ability to demonstrate understanding of metrological support, standardization, problems and areas of ensuring the quality of production and technologies.</p> <p>SK-10. The ability to use modern technologies for designing, developing designs and original layouts of printed and electronic publications using computer publishing systems, and</p>
--	---

		<p>to apply means of automating elements of the technological process.</p> <p>SK-11. Ability to implement technologies for the production of printed products and electronic publications.</p> <p>SK-12. Ability to apply the principles of processing, reproduction, storage, modeling of three-dimensional scenes, animated, audio and video information for use in multimedia publications.</p> <p>SK-13. Ability to design, develop and maintain web documents, develop multimedia information products, design and develop software application interfaces (UI/UX).</p> <p>SK-14. Ability to develop color solutions for multimedia and printed products, perform tonal and color correction of images, work with a color management system and manage color in the processes of computer and printing color reproduction.</p> <p>SK-15. Ability to identify demand for publishing and printing products and assess its market situation, calculate the profitability of a specific project; determine the parameters of the designed publications; participate in marketing activities of the publishing house; work with the publishing house's client base.</p> <p>SK-16. Ability to use information technologies, software and hardware for the development of new publishing projects, production of products</p>
12.	Learning outcomes of higher education	<p>Program learning outcomes:</p> <ol style="list-style-type: none"> 1. PR-01. Apply theories and methods of mathematics, physics, chemistry, engineering sciences to solve complex tasks and practical problems of publishing and printing. 2. PR-02. Find, evaluate and use information from various sources necessary for solving theoretical and practical tasks of publishing and printing. 3. PR-03. Rationally use energy and other types of resources in technological processes. 4. PR-07. Understand the principles and have the skills to use prepress technologies, printing and postpress processes, color theory, methods of processing text and multimedia information. Understand the principles and have the skills to use prepress technologies, printing and postpress processes based on physical laws. 5. PR-08. Ensure the quality of printed and electronic publications through understanding the physical foundations of equipment operation and the influence of technological process parameters. 6. PR-10. Evaluate the technical characteristics of printed and electronic publications, packaging, multimedia information

		<p>products based on knowledge of the physical laws of optics, mechanics, electrodynamics, thermodynamics.</p> <p>7. PR-12. Develop, provide and implement a technological process, reasonably selecting materials, quality control systems, hardware and software complexes, equipment, personnel and other resources. Reasonably select materials, hardware and software complexes and equipment taking into account their physical properties and principles of operation.</p> <p>8. PR-13. Monitor the accuracy and stability of technological processes, the technical condition of equipment, the quality of materials and finished products, using physical methods of measurement and control.</p> <p>9. PR-26. Use knowledge of color theory and information processing methods, printing technologies and binding and bookbinding processes to ensure the quality of printed products.</p> <p>10. PR-27. Calibrate instruments and devices for measuring the quality parameters of materials, semi-finished products, products and equipment during the production of printed publications.</p>															
13.	Assessment system according to each task for passing the exam	<p>To evaluate the student's work during the semester, the final rating O_{sem} is calculated as the sum of grades for different types of classes and control activities, which include practical classes, laboratory work, individual calculation task and modular testing.</p> <p>The combined exam is used as a form of final control for the discipline "Physics". With this type of control, the final grade is calculated by the formula: $P_n = 0,6 \cdot O_{sem} + 0,4 \cdot O_{ex}$, where O_{sem} – grade for the semester in a 100-point system, O_{ex} – grade for the exam in a 100-point system.</p> <p>The final grade is translated into national and ECTS according to the scale:</p> <table border="1"> <thead> <tr> <th>Grade from the discipline</th><th>Score on a national scale</th><th>ECTS scale score</th></tr> </thead> <tbody> <tr> <td>96-100</td><td>5 (perfectly)</td><td>A</td></tr> <tr> <td>90-95</td><td>5 (perfectly)</td><td>B</td></tr> <tr> <td>75-89</td><td>4 (good)</td><td>C</td></tr> <tr> <td>66-74</td><td>3 (satisfactorily)</td><td>D</td></tr> </tbody> </table>	Grade from the discipline	Score on a national scale	ECTS scale score	96-100	5 (perfectly)	A	90-95	5 (perfectly)	B	75-89	4 (good)	C	66-74	3 (satisfactorily)	D
Grade from the discipline	Score on a national scale	ECTS scale score															
96-100	5 (perfectly)	A															
90-95	5 (perfectly)	B															
75-89	4 (good)	C															
66-74	3 (satisfactorily)	D															

		60-65	3 (satisfactorily)	E
		35-59	2 (unsatisfactorily)	FX
		1-34		F
14.	The quality of the educational process	The content of the discipline can be updated depending on the modern needs of the specialty		
15.	Methodical support	<p>Basic literature</p> <p>1. General Physics with Examples and Problems. Mechanics: A Textbook for Students of All Specialties and Forms of Study [Electronic Resource] / Compiled by: A.I. Rybalka et al. – Kharkiv: KhNURE, 2024. – 220 p.</p> <p>2. General physics with examples and problems. Part 2. Electricity and magnetism: textbook. manual./ IM Kibets and others. - Kharkiv: SMITH Company, 2009-424p .;</p> <p>3. General physics with examples and problems. Part 3, item 1. Optics: textbook. manual / IM Kibets and others. - H.: SMITH Company, 2012. - 232p.</p> <p>4. General physics with examples and problems. Part 3, item 2. Quantum and atomic physics. Solid state physics. Nuclear physics: textbook / IM Kibets and others. –H .: SMITH Company, 2013. – 304p.</p> <p>Supporting literature</p> <p>1. Collection of tests from the course of physics / O.M. Kovalenko and others.-Kharkiv: KNURE, 2006.-124p.</p> <p>2. Dictionary of physical terms: textbook / TB Tkachenko.- Kharkiv: KNURE, 2004.-80p.</p> <p>Methodical instructions for different types of classes</p> <p>1. Methodical instructions for software in the course of physics (part 1) / Edited by: VO Storozhenko and others. –Kharkiv: KhNURE, 2013.-152p.</p> <p>2. Methodical instructions for software in physics (part 2) / Edited by: VO Storozhenko and others. –Kharkiv: KhNURE, 2013.-140p.</p> <p>3. Methodical instructions for laboratory work in physics. Part 2. Electricity and magnetism. / Edited by: RP Orel and others. - Kharkiv: KNURE, 2019. - 120p.</p> <p>4. Methodical instructions for laboratory work in physics. Part 3. Optics. Atomic physics and solid state physics / Emphasis. Malik SB et al.-Kharkiv: KNURE, 2011.</p>		

		<p>5. Methodical instructions for computer laboratory work in physics./ Compiled by: R.P. Orel and others. – Kharkiv: KhNURE, 2021. – 133p.</p> <p>Information support: http://physic.nure.ua http://catalogue.nure.ua/knmz/?subdivision=24&level=0&query=undefined</p>
16.	Syllabus developer	<p>Associate Professor of Physics Sergiy Meshkov sergiy.meshkov@nure.ua Head of the Department of Physics Olena Kovalenko, olena.kovalenko@nure.ua</p>