

**SYLLABUS**  
**in the discipline "Physics"**  
**for students of the first (bachelor's) level of higher education**  
**specialty F5 Cyber Security and Information Protection**  
**educational and professional programs Information Security System**  
**Kharkiv National University of Radio Electronics**

1.	Name of the faculty	Information and Analytical Technologies and Management
2.	Higher education level	Bachelor
3.	Code and name of the specialty	F5 Cyber Security and Information Protection
4.	Type and name of educational program	Information Security System
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, self-work 42 hours 2nd semester 90 hours, of which: lectures 20 hours, practical 8 hours, laboratory 8 hours, consultations 6 hours, self-work 48 hours
8.	Schedule of study of the discipline	1st year, 2nd semester
9.	Prerequisites for studying the discipline	Knowledge of the beginning of mathematical analysis (integral and differential computation), analytical geometry and linear algebra (actions with vectors), chemistry (atomic-molecular theory, structure of atoms and molecules).
10.	Discipline abstract	<p><b>Content module 1. Physical foundations of mechanics. (1st semester)</b>  Topic 1. Kinematics. Dynamics of translational motion.  Topic 2. Work and energy.  Topic 3. Dynamics of rotational motion.  Topic 4.. Mechanical oscillations.</p> <p><b>Content module 2. Electrostatics.</b>  Topic 5. Electric field in vacuum.  Topic 6. Electric field in dielectrics.  Topic 7. Conductors in an electric field.  Topic 8. Direct current.</p> <p><b>Content module 3. Magnetic field.( 2nd semester)</b>  Topic 9. Magnetic field in vacuum.  Topic 10. Magnetic field in matter.  Topic 11. The phenomenon of electromagnetic induction.</p> <p><b>Content module 4. Oscillations and waves. Optics.</b>  Topic 12. Electromagnetic field. Maxwell's equations.  Topic 13. Electromagnetic oscillations. Laws of alternating current.  Topic 14. Elastic waves.  Topic 15. Electromagnetic waves.  Topic 16. Wave optics.</p>
11.	Competences, knowledge, skills, understanding, which is acquired by the applicant of higher education in the process of learning	<p><b>Competencies provided by studying the discipline:</b>  The ability to think abstractly, analyze, and navigate the flow of scientific and technical information.  The ability to apply knowledge in practical situations  The ability to model physical phenomena, perform theoretical and experimental research.  The ability to learn independently and master new knowledge  During the study of the discipline, applicants acquire the following competencies:  CG 1. The ability to apply knowledge in practical situations.  CG 3. The ability to communicate professionally in the state and foreign languages, both orally and in writing.  CG 4. The ability to identify, pose, and solve problems in a professional direction.</p>

		CG 5. The ability to search, process, and analyze information.																							
12.	Learning outcomes of higher education	<p><b>Studying this discipline enables the student to:</b>  know: the basics of physical laws and fundamental physical concepts, laws and theories of classical and modern physics and the limits of their application, the essence of physical phenomena, areas of their practical use, physical principles of operation of modern technological equipment and apparatus in the field of professional activity; purpose and possibilities of using experimental equipment for conducting physical research.</p> <p>Program learning outcomes that directly link physics with the practice of the educational and professional program "Technical Information Protection Systems" that must be demonstrated by a higher education applicant:</p> <p>PL1 apply knowledge of state and foreign languages in order to ensure the effectiveness of professional communication;</p> <p>PL3 use the results of independent search, analysis and synthesis of information from various sources to effectively solve specialized tasks of professional activity;</p> <p>PL4 analyze, argue, make decisions when solving complex specialized tasks and practical problems in professional activity, which are characterized by complexity and incomplete certainty of conditions, be responsible for the decisions made;</p> <p>PL6 critically reflect on the basic theories, principles, methods and concepts in education and professional activity.</p>																							
13.	Assessment system for each task for passing the test / exam	<p>For assessment the student's work during the semester, the final rating <math>O_{sem}</math> 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 <math>P_n</math> is calculated by the formula: <math>P_n = 0,6 \cdot O_{sem} + 0,4 \cdot O_{ex}</math>, where <math>O_{sem}</math> - grade for the semester in a 100-point system, <math>O_{ex}</math> - grade for the exam in a 100-point system.</p> <p>The final grade <math>P_n</math> is translated into national and ECTS according to the scale:</p> <table border="1"> <thead> <tr> <th>Assessment in the discipline</th><th>Assessment on a national scale</th><th>Assessment on the ECTS scale</th></tr> </thead> <tbody> <tr> <td>96-100</td><td>5 (excellent)</td><td>A</td></tr> <tr> <td>90-95</td><td>5 (excellent)</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 (satisfactory)</td><td>D</td></tr> <tr> <td>60-65</td><td>3 (satisfactory)</td><td>E</td></tr> <tr> <td>35-59</td><td rowspan="2">2 (unsatisfactory)</td><td>FX</td></tr> <tr> <td>1-34</td><td>F</td></tr> </tbody> </table>	Assessment in the discipline	Assessment on a national scale	Assessment on the ECTS scale	96-100	5 (excellent)	A	90-95	5 (excellent)	B	75-89	4 (good)	C	66-74	3 (satisfactory)	D	60-65	3 (satisfactory)	E	35-59	2 (unsatisfactory)	FX	1-34	F
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14.	The quality of the educational process	Adherence to the principles of academic integrity ( <a href="http://lib.nure.ua/plagiat">http://lib.nure.ua/plagiat</a> ). The content of the academic discipline may be updated depending on the current needs of the specialty.																							
15.	Methodical support	<p><b>Basic Literature:</b></p> <p>1. Zagal'nafizyka z prykladamyizadachamy. Chastyna 1. Mehanika. Molekuljarnafizyka ta termodynamika: navch. Posibnyk/ V.O. Storozhenko ta in.-Harkiv: TOV «Kompanija SMIT», 2006. – 320 s.</p> <p>2. Zagal'nafizyka z prykladamyizadachamy. Chastyna 2. Elektryka ta magnetyzm: navch. posibnyk. / I.M. Kibec' ta in. - Harkiv: «Kompanija SMIT», 2009 – 424s.;</p>																							

		<p>3. Zagal'nafizyka z prykladamyizadachamy. Chastyna 3, t.1. Optyka: navch.posibnyk / I.M. Kibec' ta in. – H.:Kompanija SMIT, 2012. – 232s.</p> <p>4. Zagal'nafizyka z prykladamyizadachamy. Chastyna 3, t.2. Kvantova ta atomnafizyka. Fizykatverdogotila. Jadernafizyka: navch.posibnyk / I.M.Kibec' ta in. –H.:Kompanija SMIT, 2013.–304s..</p> <p><b>Additional literature:</b></p> <p>1. Zbirnyktestiv z kursufizyky/ O.M. Kovalenko ta in.-Harkiv: HNURE,2006.-124s.</p> <p>2. Slovnykfizychnyhterminiv: navch.-dovidkovyjposibnyk/ T.B. Tkachenko.-Harkiv: HNURE,2004.-80s.</p> <p><b>Methodical instructions to take up views:</b></p> <p>1. Metodychnivkazivky do PZ z kursufizyky (chastyna 1)/Uporjad.:V.O.Storozhenko ta in. –Harkiv:HNURE, 2013.-152s.</p> <p>2. Metodychnivkazivky do PZ z fizyky (chastyna2)/Uporjad.:V.O.Storozhenko ta in. –Harkiv:HNURE, 2013.-140s.</p> <p>3. Metodychnivkazivky do laboratornyhrobit z fizyky. Chastyna 1. Mehanika ta molekuljarnafizyka. / Uporjad.: O.V. Vyshnivec'kyj ta in. – Harkiv: HNURE, 2009. – 84s.</p> <p>4. Metodychnivkazivky do laboratornyhrobit z fizyky. Chastyna 2. Elektrykaimagnetyzm. / Uporjad.: R. P. Orel ta in. – Harkiv: HNURE, 2019. – 120s.</p> <p>5. Metodychni vkazivky do kompiuternykh laboratornykh robit z dystsypliny «FIZYKA» dlja studentiv usikh spetsialnostei i form navchannia / Uporiad.: R. P. Orel, O. M. Kovalenko, A. I. Rybalka ta inshi – Kharkiv: KhNURE, 2021. – 132 s</p> <p>6.</p> <p><b>Information support:</b></p> <p><a href="http://physic.nure.ua">http://physic.nure.ua</a></p> <p><a href="http://catalogue.nure.ua/knmz/?subdivision=24&amp;level=0&amp;query=undefined">http://catalogue.nure.ua/knmz/?subdivision=24&amp;level=0&amp;query=undefined</a></p>
16.	Syllabus developer	Associated Professor of Physics Department Alexander Myagky aleksandr.mjagky@nure.ua