

SYLLABUS
in the discipline "Physics"
for students of the first (bachelor's) level of higher education
specialty 126 Information systems and technologies
educational and professional program Information Technologies of the Internet of Things
Kharkiv National University of Radio Electronics

1.	Name of the faculty	Faculty of Information Radio Technologies and Technical Information Security
2.	Level of higher education	bachelor
3.	Code and name of the specialty	126 Information systems and technologies
4.	Type and name of educational program	Information Technologies of the Internet of Things
5.	Code and name of the discipline	Physics
6.	Number of ECTS credits	6
7.	Discipline structure (distribution by types and hours of study)	180 hours, of which: lectures 40 hours, practical 18 hours, laboratory 20 hours, consultations 14 hours, independent work 88 hours
8.	The schedule of studying the discipline	1 course, 2nd semester
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	<p>Content module 1. Mechanics. Theme 1. Kinematics. Theme 2. Dynamics of translational motion. Theme 3. Work and energy. Theme 4. Dynamics of rotational motion. Theme 5. Mechanical oscillations.</p> <p>Content module 2. Electrostatics and magnetic field. Theme 6. Electric field in vacuum. Theme 7. Electric field in dielectrics. Theme 8. Conductors in an electric field. Theme 9. Direct current. Theme 10. Magnetic field in vacuum. Theme 11. The phenomenon of electromagnetic induction. Theme 12. Magnetic field in matter. Theme 13. Electromagnetic field.</p> <p>Content module 3. Oscillations and waves. Optics. Elements of quantum mechanics. Theme 14. Electromagnetic oscillations. Laws of alternating current.. Theme 15. Electromagnetic waves. Theme 16. Wave optics. Theme 17. Quantum optics. Theme 18. Bohr's theory of the structure of the hydrogen atom. Theme 19. Fundamentals of quantum mechanics.</p>
11.	Competences, knowledge, skills, understanding, which is acquired by the applicant of higher education in the process of learning	<p>Competences that provide the study of the discipline: Ability to abstract and logical thinking, analysis Ability to apply knowledge in practical situations Ability to model physical phenomena, perform theoretical and experimental studies. Ability to learn independently, to master new knowledge</p>

		Ability to work with scientific equipment and measuring instruments, process and analyze the results of scientific research																							
12.	Learning outcomes of higher education	<p>The study of this discipline gives the student the opportunity to:</p> <p>know: basics of physical laws and fundamental physical concepts, laws and theories of classical and modern physics, the essence of physical phenomena, areas of their practical application, physical principles of modern technological equipment and apparatus in the field of professional activity; purpose and possibilities of application of the experimental equipment for carrying out physical research.</p> <p>be able to: Apply a thorough knowledge of the basic forms and laws of abstract and logical thinking, the basics of the methodology of scientific knowledge, to analyze the relationship of physical phenomena of different nature; apply physical knowledge to solve practical problems for processing and synthesis of information in the subject area of computer science. to analyze the influence of physical phenomena on the modes of operation of modern technology; plan and conduct the simplest physical experiments using modern equipment and process the results of these experiments; highlight specific physical content in the applied problems of the future specialty.</p> <p>have: modern methods of physical research, knowledge of the laws of physical phenomena, their properties and models of physical processes.</p>																							
13.	Assessment system for each task for passing the test / 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 P_n 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 P_n is translated into national and ECTS according to the scale:</p> <table border="1" data-bbox="603 1317 1497 1693"> <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
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																							
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> <ol style="list-style-type: none"> 1. Zagal'na fizyka z prykladamy i zadachamy. Chastyna 1. Mehanika. Molekuljarna fizyka ta termodynamika: navch. Posibnyk/ V.O. Storozhenko ta in.-Harkiv: TOV «Kompanija SMIT», 2006. – 320 s. 2. Zagal'na fizyka z prykladamy i zadachamy. Chastyna 2. Elektryka ta magnetyzm: navch. posibnyk. / I.M. Kibec' ta in. - Harkiv: «Kompanija SMIT», 2009 – 424s.; 3. Zagal'n afizyka z prykladamy i zadachamy. Chastyna 3, t.1. Optyka: navch.posibnyk / I.M. Kibec' ta in. – H.:Kompanija SMIT, 2012. – 232s. 4. Zagal'na fizyka z prykladamy i zadachamy. Chastyna 3, t.2. Kvantova ta atomna fizyka. Fizyka tverdogo tila. Jaderna fizyka: navch.posibnyk / I.M.Kibec' ta in. –H.:Kompanija SMIT, 2013.–304s.. <p>Additional literature:</p> <ol style="list-style-type: none"> 1. Zbirnyktestiv z kursufizyky/ O.M. Kovalenko ta in.-Harkiv: HNURE,2006.-124s. 2. Slovnyk fizychnyh terminiv: navch.-dovidkovyj posibnyk/ T.B. Tkachenko.-Harkiv: HNURE,2004.-80s. <p>Methodical instructions to take up views:</p> <ol style="list-style-type: none"> 1. Metodychni vkazivky do PZ z kursufizyky (chastyna 1)/Uporjad.:V.O.Storozhenko ta in. –Harkiv:HNURE, 2013.-152s. 2. Metodychni vkazivky do PZ z fizyky (chastyna2)/Uporjad.:V.O.Storozhenko ta in. –Harkiv:HNURE, 2013.-140s. 3. Metodychni vkazivky do laboratornyh robit z fizyky. Chastyna 1. Mehanika ta molekuljarnafizyka. / Uporjad.: O.V. Vyshnivec'kyj ta in. – Harkiv: HNURE, 2009. – 84s. 4. Metodychni vkazivky do laboratornyh robit z fizyky. Chastyna 2. Elektryka i magnetyzm. / Uporjad.: R. P. Orel ta in. – Harkiv: HNURE, 2019. – 120s. 5. Metodychni vkazivky do laboratornyh robit z fizyky. Chastyna 3. Optyka. Atomnafizyka ta fizykatverdgotila / Upor. Malyk S.B. ta in.-Harkiv: HNURE, 2011. 6. Metodychni vkazivky do komp'juternyh laboratornyh robit z fizyky./ O.M. Kovalenko ta in.- Harkiv:HNURE, 2006-124s. <p>Information support: http://physic.nure.ua https://catalogue.nure.ua/knmz/?page=1&subdivision=24&level=0&query=undefined</p>
16.	Syllabus developer	Associated Professor of Physics Department Andrey Onishchenko, andrey.onishchenko@nure.ua