SYLLABUS
in the discipline "Physics"
for students of the first (bachelor's) level of higher education
specialty 122 Computer Science
educational and professional program Information Technology Management, Artificial Intelligence
Kharkiv National University of Radio Electronics

1.	Name of the faculty	Faculty of Computer Science
2.	Level of higher education	bachelor
3.	Code and name of the specialty	122 Computer Science
4.	Type and name of educational program	Information Technology Management, Artificial Intelligence
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, 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** Theme 1. Kinematics Theme 2. Dynamics of translational motion. Theme 3. Work and energy. Theme 4. Dynamics of rotational motion. Theme 5. Mechanical oscillations. **Content module 2. Electromagnetism** Theme 1. Electric field in vacuum. Theme 2. Electric field in dielectrics and conductors. Theme 3. Direct current. Theme 4. Magnetic field in vacuum. Theme 5. Magnetic field in matter. Theme 6. Electromagnetic induction. Theme 7. Electromagnetic oscillations. Theme 8. Alternating current. Theme 9. Electromagnetic waves. **Content module 3. Wave and quantum optics** Theme 1. Interference. Theme 2. Diffraction. Theme 3. Polarization. Dispersion. Theme 4. Thermal radiation. Theme 5. Photo effect.
11.	Competences, knowledge, skills, understanding, which is acquired by the applicant in higher education in the learning process	**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 Ability to work with scientific equipment and measuring instruments, process and analyze the results of scientific research

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<tr><td>12.</td><td>Learning outcomes of higher education</td><td>The study of this discipline gives the student the opportunity to:
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.
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.
have: modern methods of physical research, knowledge of the laws of physical phenomena, their properties and models of physical processes.</td></tr>
<tr><td>13.</td><td>Assessment system according to each task for passing the exam</td><td>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.
The distribution of points for different types of classes / tests is given in the table:
<table>
<tr><td>Type of lesson / control measure</td><td>Rating O_{sem}</td></tr>
<tr><td>Lw</td><td>10</td></tr>
<tr><td>Pc</td><td>20</td></tr>
<tr><td>Test 1</td><td>8</td></tr>
<tr><td>Checkpoint 1</td><td>38</td></tr>
<tr><td>Lw</td><td>16</td></tr>
<tr><td>Pc</td><td>18</td></tr>
<tr><td>SGT</td><td>12</td></tr>
<tr><td>Test 2</td><td>16</td></tr>
<tr><td>Checkpoint 2</td><td>62</td></tr>
<tr><td>Total for the semester</td><td>100</td></tr>
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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.
The final grade is translated into national and ECTS according to the scale:
<table>
<tr><td>Grade from the discipline</td><td>Score on a national scale</td><td>ECTS scale score</td></tr>
<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>
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<tr><td>60-65</td><td>3 (satisfactorily)</td><td>E</td></tr>
<tr><td>35-59</td><td rowspan="2">2 (unsatisfactorily)</td><td>FX</td></tr>
<tr><td>1-34</td><td>F</td></tr>
</table></td></tr>
<tr><td>14.</td><td>The quality of the educational process</td><td>The content of the discipline can be updated depending on the modern needs of the specialty.</td></tr>
<tr><td>15.</td><td>Methodical support</td><td>Basic literature
1. General physics with examples and problems. Part 1. Mechanics. Molecular physics and thermodynamics / Order. T.B. Tkachenko, MI Ukrainian and others. –- Kharkiv, KNURE, 2004. - 108 p.
1. General physics with examples and problems. Part 2. Electricity and magnetism: textbook. manual./ IM Kibets and others. - Kharkiv: SMITH Company, 2009 - 424p .;
2. General physics with examples and problems. Part 3, item 1. Optics: textbook / IM Kibets and others. - H.: SMITH Company, 2012. - 232p.
Supporting literature
1. Elementary physics in examples and problems: textbook. Manual for preparatory departments / A.D. Tevyashev et al. - Kharkov: KNURE, 2005. - 628p.
2. Collection of tests from the course of physics / O.M. Kovalenko and others.- Kharkiv: KNURE, 2006. –124s.
3. Dictionary of physical terms: textbook / TB Tkachenko.- Kharkiv: KNURE, 2004.-80p.
4. Savelyev IV Physics course. T.1,2,3.-M .: Nauka, 1989.

Methodical instructions for different types of classes
1. Methodical instructions for software in the course of physics (part 1) / Edited by: VO Storozhenko and others. –Kharkiv: KhNURE, 2013.-152p.
2. Methodical instructions for software in physics (part 2) / Edited by: VO Storozhenko and others. –Kharkiv: KhNURE, 2013.-140p.
3. Methodical instructions for laboratory work in physics. Part 2. Electricity and magnetism. / Edited by: RP Orel and others. - Kharkiv: KNURE, 2019. - 120p.
4. Methodical instructions for laboratory work in physics. Part 3. Optics. Atomic physics and solid state physics / Emphasis. Malik SB etc. - Kharkiv: KNURE, 2011.
5. Methodical instructions for computer laboratory work in physics./ O.M. Kovalenko and others.- Kharkiv: KNURE, 2006-124p.

Information support:
http://physic.nure.ua
http://catalogue.nure.ua/knmz/?subdivision=24&level=0&query=undefined</td></tr>
<tr><td>16.</td><td>Syllabus developer</td><td>Head of the Department of Physics Kovalenko Olena Mykolayivna, olena.kovalenko@nure.ua</td></tr>
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