Syllabus of the discipline Physics
for students of the first (bachelor's) level of higher education
specialty 121. Software engineering
educational and professional program "Software Engineering"

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| 1 | Name of the faculty | Faculty of Computer Science |
| 2 | Level of higher education | bachelor |
| 3 | Code and name of the specialty | 121. Software engineering |
| 4 | Type and name of educational program | "Software Engineering" |
| 5 | Code and name of the discipline | Physics |
| 6 | Number of ECTS credits | 6 |
| 7 | Discipline structure (distribution by types and hours of study) | 1,2 semesteri, 180 hours, of which: lectures 40 hours, practical 18 hours, laboratory 18 hours, consultations 14 hours, independent work 94 hours. |
| 8 | The schedule of studying the discipline | 1st year, 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.** Classical mechanics.<br>Theme 1. Kinematics.<br>Theme 2. Dynamics<br>Theme 3. Laws of conservation.<br>**Content module 2.** Classical electrodynamics.<br>Theme 4. Electric field.<br>Theme 5. Direct current.<br>Theme 6. Magnetic field.<br>Theme 7. Electromagnetic field.<br>**Content module 3.** Electromagnetic oscillations and waves.<br>Theme 8. Electromagnetic oscillations.<br>Theme 9. Alternating current.<br>Theme 10. Electromagnetic waves. |

<table>
<tr><td>11</td><td>Competences, knowledge, skills, understanding, which is acquired by the applicant in higher education in the learning process</td><td>Competences that provide the study of the discipline:<br>An epistemological approach to the study of natural phenomena and the development of technology.<br>Knowledge of the fundamental laws of physics and the ability to apply them in practice.<br>Understanding the concepts of basic physical quantities, determining their content, means and units of their measurement.<br>Ability to work with scientific equipment and measuring instruments, process and analyze the results of scientific research.</td></tr>
<tr><td>12</td><td>Learning outcomes of higher education</td><td>The study of this discipline gives the student opportunities:<br><u>Know</u>: basic physical laws and concepts, the essence of various phenomena and methods of their description, the relationship of physical quantities and their units, methods of research and processing of their results, the application of physical laws and phenomena in modern computer technology.<br><u>Be able to:</u> analyze natural phenomena and technical processes, apply physical laws to implement practical knowledge, use modern equipment to prove experimental research and computer processing of the results</td></tr>
<tr><td>13</td><td>Assessment system according to each task for passing the exam</td><td>To evaluate the work of students during the semester, the rating is calculated as the sum of grades for different types of classes and control measures, which include<br>Includes practical classes, laboratory work and individual homework.<br>The distribution of points for different types of classes / control activities are given in the table:
<table>
<tr><th>Control measure</th><th>Rating $O_{sem}$</th></tr>
<tr><td colspan="2">Semester 1</td></tr>
<tr><td>Lw №1</td><td>3 . . . 6</td></tr>
<tr><td>Lw №2</td><td>3 . . . 6</td></tr>
<tr><td>Lw № 3</td><td>4 . . . 8</td></tr>
<tr><td>Pc №1</td><td>3 . . . 6</td></tr>
<tr><td>Pc №2</td><td>3 . . . 6</td></tr>
<tr><td>Pc №3</td><td>4 . . . 8</td></tr>
<tr><td>Checkpoint 1</td><td>20 . . . 40</td></tr>
<tr><td>Lw №4</td><td>4 . . . 6</td></tr>
<tr><td>Lw №5</td><td>4 . . . 6</td></tr>
<tr><td>Lw №6</td><td>4 . . . 6</td></tr>
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| | | Pc №4 — 4 . . . 6<br>Pc №5 — 4 . . . 6<br>Individual homework — 20 … 30<br>**Checkpoint 2 — 40 … 60**<br>**Total for the semester — 60 … 100**<br>**Semester 2**<br>Lw №1 — 5 … 10<br>Lw №2 — 5 . . . 10<br>Pc №1 — 5 . . . 10<br>Pc №2 — 5 . . . 10<br>**Checkpoint 1** — 20 … 40<br>Lw №3 — 5 … 8<br>Lw №4 — 5 … 8<br>Pc №3 — 5 … 7<br>Pc №4 — 5 … 7<br>Individual homework — 20 … 30<br>**Checkpoint 2 — 40 . . . 60**<br>**Total for the semester — 60 . . . 100**<br>As a form of final control in the 1st module the credit is used. The final grade is defined as the number of points obtained by the student for the implementation of control measures during the semester.<br>As a form of final control in the 2nd module there is a combined exam. With this type of control, the final score is calculated by the formula:<br>$Q_{fin} = 0,6 * Q_{sem} + 0,4 * Q_{ex}$, where $Q_{sem}$ – grade for the semester, $Q_{ex}$ – score for the exam on a 100-point scale<br>The final grade is translated into national and ECTS according to the scale: |

| Grade from the discipline | Score on a national scale | | ECTS scale score |
|---|---|---|---|
| | exam | credit | |
| 96-100 | 5 (perfectly) | passed | 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) | not passed | FX |
| 1-34 | | | F |

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| 14 | The quality of the educational process | Adherence to academic integrity by teachers, in particular: references to sources of information in the case of use of information, compliance with copyright law, providing reliable scientific and methodological activities, monitoring the observance of academic integrity by applicants for higher education. |

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| | | Observance of academic integrity by applicants for higher education, in particular:<br>independent performance of educational tasks, references to sources of information in case of use of information; providing reliable information about the results of their own educational activities. |
| 15 | Methodical support | **Basic literature**<br>1. General physics with examples and problems. Part 1. Mechanics. Molecular physics and thermodynamics: textbook. manual / VO Storozhenko and others. - Kharkiv: SMIT Company LLC, 2006 - 320p.<br>2. General physics with examples and problems. Part 2. Electricity and magnetism: textbook. manual / IM Kibets and others. - Kharkiv: SMITH Company LLC, 2009 - 424p.<br>3. Synopsis of lectures on physics for bachelors in the field of "Software Engineering" (Electronic edition) / emphasis. V.O. Storozhenko, OV Soft - Kharkiv: KNURE, 2020 - 196p.<br>**Supporting literature**<br>1. Tests of the course of physics / O.M. Kovalenko and others. - Kharkiv: KNURE, 2006, - 124p.<br>**Methodical instructions for different types of classes**<br>1. Methodical instructions for software in physics (Part 1) / Edited by: V.O. Storozhenko and others. - Kharkiv: KNURE, 2013 - 152p.<br>2. Methodical instructions for software in physics (Part 2) / Edited by: V.O. Storozhenko and others. - Kharkiv: KNURE, 2013 - 140p.<br>3. Methodical instructions for laboratory work in physics. Part 1. Mechanics and molecular physics / O. V. Vyshnivetsky and others. - Kharkiv: KNURE, 2009– 84p.<br>4. Methodical instructions for laboratory work in physics. Part 2. Electricity and magnetism / O. M. Kovalenko and others. - Kharkiv: KhNURE, 2006– 96p. |
| 16 | Syllabus developer | Professor of the Department of Physics Volodymyr Oleksandrovych Storozhenko.<br>volodymyr.storozhenko@nure.ua |