

SYLLABUS
in the discipline "Physics"
for students of the first (bachelor's) level of higher education
specialty 171 Electronics
educational and professional program Electronic devices and systems

1.	Name of the faculty	Faculty of Electronic and Biomedical Engineering
2.	Level of higher education	bachelor
3.	Code and name of the specialty	171 Electronics
4.	Type and name of educational program	Electronic devices and systems
5.	Code and name of the discipline	Physics
6.	Number of ECTS credits	10
7.	Discipline structure (distribution by types and hours of study)	1st semester 150 hours, of which: lectures 34 hours, practical 16 hours, laboratory hours 16, consultations 10 hours, independent work 74 hours 2nd semester 150 hours, of which: lectures 32 hours, practical 16 hours, laboratory 16 hours, consultations 10 hours, independent work 76 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, including mathematical analysis (differential and integral calculation), analytical geometry and linear algebra (actions with vectors), chemistry (atomic-molecular theory, structure of atoms and molecules).
10.	Discipline abstract	<p>Content module 1. Physical foundations of 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. Theme 6. Molecular kinetic energy of an ideal gas. Theme 7. Classical statistical physics. Theme 8. Thermodynamics</p> <p>Content module 2. Electrostatics. Theme 9 Electric field in vacuum. Theme 10. Electric field in dielectrics. Theme 11. Conductors in an electric field. Theme 12. Direct current.</p> <p>Content module 3. Magnetic field. Theme 13. Magnetic field in vacuum. Theme 14. Magnetic field in matter. Theme 15. The phenomenon of electromagnetic induction. Theme 16. Electromagnetic field. Theme 17. Electromagnetic oscillations and alternating current</p> <p>Content module 4. Waves. Optics. Elements of quantum mechanics and solid state physics Theme 18. Waves. Theme 19. Wave optics. Theme 20. Quantum optics. Theme 21. Quantum mechanics. Theme 22. Quantum theory of the structure of atoms and molecules. Theme 23. Band theory of electrical conductivity of solids. Theme 24. Electrical conductivity of metals and semiconductors.</p>

11.	Competences, knowledge, skills, understanding, which is acquired by the applicant in higher education in the learning process	<p>Competences that provide the study of the discipline: Ability to abstract thinking, analysis, the ability to navigate in the flow of scientific and technical information. 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, solve applied engineering problems in their specialty.</p>																							
12.	Learning outcomes of higher education	<p>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 and the limits of their application, the essence of physical phenomena, areas of their practical use, 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: analyze the relationship of physical phenomena of different nature; apply knowledge of physical laws to solve practical problems that arise during the development and operation of radio systems and television and radio broadcasting systems, etc .; 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 experimental physical research and processing of their results, basic methods of working with physical equipment and methods for estimating the errors of experiments.</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" data-bbox="595 1563 1487 1937"> <thead> <tr> <th data-bbox="595 1563 890 1691">Grade from the discipline</th> <th data-bbox="898 1563 1249 1691">Score on a national scale</th> <th data-bbox="1257 1563 1487 1691">ECTS scale score</th> </tr> </thead> <tbody> <tr> <td data-bbox="595 1697 890 1731">96-100</td> <td data-bbox="898 1697 1249 1731">5 (perfectly)</td> <td data-bbox="1257 1697 1487 1731">A</td> </tr> <tr> <td data-bbox="595 1738 890 1771">90-95</td> <td data-bbox="898 1738 1249 1771">5 (perfectly)</td> <td data-bbox="1257 1738 1487 1771">B</td> </tr> <tr> <td data-bbox="595 1778 890 1812">75-89</td> <td data-bbox="898 1778 1249 1812">4 (good)</td> <td data-bbox="1257 1778 1487 1812">C</td> </tr> <tr> <td data-bbox="595 1818 890 1852">66-74</td> <td data-bbox="898 1818 1249 1852">3 (satisfactorily)</td> <td data-bbox="1257 1818 1487 1852">D</td> </tr> <tr> <td data-bbox="595 1859 890 1892">60-65</td> <td data-bbox="898 1859 1249 1892">3 (satisfactorily)</td> <td data-bbox="1257 1859 1487 1892">E</td> </tr> <tr> <td data-bbox="595 1899 890 1933">35-59</td> <td data-bbox="898 1899 1249 1933" rowspan="2">2 (unsatisfactorily)</td> <td data-bbox="1257 1899 1487 1933">FX</td> </tr> <tr> <td data-bbox="595 1939 890 1973">1-34</td> <td data-bbox="1257 1939 1487 1973">F</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	60-65	3 (satisfactorily)	E	35-59	2 (unsatisfactorily)	FX	1-34	F
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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	Basic literature																							

		<p>1. General physics with examples and problems. Part 1. Mechanics. Molecular physics and thermodynamics: textbook. manual./ VO Storozhenko and others. - Kharkiv: SMITH Company, 2006 - 320p .;</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>5. A short course in physics. Textbook / IN Kibets et al ..- H .: SMITH Company. 2015.-328p.</p> <p>Supporting literature</p> <p>1. Collection of tests in the course of physics / O.M. Kovalenko and others.- Kharkiv: KNURE, 2006.-124p.</p> <p>2. Dictionary of physical terms: textbook / T.B. Tkachenko.- Kharkiv: KNURE, 2004.-80p.</p> <p>3. Savelyev IV Course Physics. T.1,2,3.-M .: Nauka, 1989.</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 1. Mechanics and molecular physics. / Edited by: OV Vyshnivetsky and others. - Kharkiv: KNURE, 2009. - 84p.</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 etc. - Kharkiv: KNURE, 2011.</p> <p>5. Methodical instructions for computer laboratory work in physics./ O.M. Kovalenko and others.- Kharkiv: KNURE, 2006-124p.</p> <p>Information support: http://physic.nure.ua http://catalogue.nure.ua/knmz/?subdivision=24&level=0&query=undefined</p>
16.	Syllabus developer	Associate Professor of Physics Kalinin Vitaly Veniaminovich, vitaly.kalinin@nure.ua