SYLLABUS in the discipline "Physics" for students of the first (bachelor's) level of higher education specialty 153 Micro- and nanosystem technology educational and professional program Micro- and nanoelectronics

1	Nome of the formula	Equilibrium of Electronic and D'anna d'ant Englishers'		
1.	Name of the faculty	Faculty of Electronic and Biomedical Engineering		
2.	Level of higher education	bachelor		
3.	Code and name of the specialty	153 Micro- and nanosystem technology		
4.	Type and name of educational program	Micro- and nanoelectronics		
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 hours 12, consultations 6 hours, independent work 42 hours 2nd semester 90 hours, of which: lectures 20 hours, practical 8 hours, laboratory 8 hours, consultations 6 hours, independent work 48 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	Content module 1. Physical foundations of mechanics.		
	•	Theme1. 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. Electrostatics.		
		Theme 6Electric field in vacuum.		
		Theme 7. Electric field in dielectrics.		
		Theme 8. Conductors in an electric field.		
		Theme 9. Direct current.		
		Content module 3. Magnetic field.		
		Theme 10. Magnetic field in vacuum.		
		Theme 11. Magnetic field in matter.		
		Theme 12. The phenomenon of electromagnetic induction.		
		Theme 13. Electromagnetic field.		
		Theme 14. Electromagnetic oscillations and alternating current		
		Content module4. Waves. Optics. Elements of quantum mechanics		
		and solid state physics		
		Theme 15. Waves.		
		Theme 16. Wave optics.		
		Theme 17. Quantum optics.		
		Theme 18. Quantum mechanics.		
		Theme 19. Quantum theory of the structure of atoms and molecules.		
		Theme 20. Band theory of electrical conductivity of solids.		
11.	Competences, knowledge,	Competences that provide the study of the discipline:		
	skills, understanding, which	Ability to abstract thinking, analysis, the ability to navigate in the flow of		
	is acquired by the applicant in	scientific and technical information.		

	higher education in the learning process	Ability to apply knowledge in practical Ability to model physical phenomena, p studies.	perform theoretical and experimental
		Ability to learn independently, to mast Ability to work with scientific equip process and analyze the results of	pment and measuring instruments, scientific research, solve applied
12.	Learning outcomes of higher	engineering problems in their specialty The study of this discipline gives the	
12.	education	know : basics of physical laws and fund	
		theories of classical and modern physical	
		the essence of physical phenomena, a	
		principles of modern technological equ	
		professional activity; purpose and p	
		experimental equipment for carrying o	
		be able to: analyze the relationship of nature; apply knowledge of physical la	
		arise during the development and opera	
		and radio broadcasting systems, etc.;	
		phenomena on the modes of operation	on of modern technology; plan and
		conduct the simplest physical experim	
		process the results of these experiments	
		in the applied problems of the future sp have: modern methods of experimental	
		their results, basic methods of work	
		methods for estimating the errors of ex	
13.	Assessment system according	To evaluate the student's work during t	
	to each task for passing the	calculated as the sum of grades for di	
	exam	activities, which include practical cla	sses, laboratory work and modular
		testing. The distribution of points for different	types of classes / tests is given in the
		table:	types of clusses / tests is given in the
		Semest	ter 1
		Control measure	Rating O _{sem}
		Lw №1	2 4
		Lw №2	2 4
		Lw №3 Control lesson	$5 \dots 10$
		Pc №1 Pc №2	$\begin{array}{cccc} 4 & \dots & 7 \\ \hline 4 & \dots & 7 \end{array}$
		Pc №3	4 7
		Test	11 14
		Checkpoint 1	32 53
		Lw Nº4	2 4
		Lw No5	$\frac{2}{5}$ 4
		Lw №6 Control lesson Pc №4	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
		Pc №5	4 7
		Test	11 15
		Checkpoint 2	28 47
		Total for the semester	60 100
		Semest	ter 2

by the applicant for education for completing control activities du semester. The combined exam is used as a form of final control for the di "Physics" in semester 2. With this type of control, the final graduated by the formula: $P_n = 0, 6 \cdot O_{sem} + 0, 4 \cdot O_{ex}$, where $O_{sem} - g$ the semester in a 100-point system, $O_{ex} - grade$ for the exam in a 10 system. The final grade is translated into national and ECTS according to the Grade from Score on a national scaleECTS scale grade scale gradeThe final grade is translated into national and ECTS according to the disciplineGrade from Score on a national scaleECTS scale grade96-1005 (perfectly)passedA90-955 (perfectly)B75-894 (good)C66-743 (satisfactorily)D60-653 (satisfactorily)D60-653 (satisfactorily)E14.The quality of the educational processThe content of the discipline can be updated depending on the mode of the specialty.								
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$\frac{Pc \ Ne1}{Pc \ Ne2} = \frac{4 \ \dots \ 7}{Pc \ Ne3} = \frac{124 \ \dots \ 43}{Score \ 124 \ \dots \ 43} = \frac{124 \ \dots \ 84}{Score \ 124 \ \dots \ 7} = \frac{124 \ \dots \ 7}{Pc \ Ne4} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 122 \ \dots \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 122 \ \dots \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 122 \ \dots \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 122 \ \dots \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 122 \ \dots \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 2} = \frac{122 \ \dots \ 20}{Score \ 20} = \frac{122 \ \dots \ 20}{Checkpoint \ 20} = \frac{122 \ \dots \ 20}{Score \ 20} = \frac{122 \ \dots \ 20}{Sc$			Lw №1 3 5					
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$\begin{tabular}{ c c c c c }\hline \hline Test & 10 & \dots & 19 \\ \hline \hline Checkpoint 1 & 24 & \dots & 43 \\ \hline Lw N&3 & 3 & \dots & 5 \\ \hline Lw N&4 Control lesson & 13 & \dots & 18 \\ \hline Pc N&3 & 4 & \dots & 7 \\ \hline Pc N&4 & 4 & \dots & 7 \\ \hline Test & 12 & \dots & 20 \\ \hline \hline Checkpoint 2 & 36 & \dots & 57 \\ \hline Total for the semester & 60 & \dots & 100 \\ \hline \hline \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$					Pc №1	4	7	
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$\begin{bmatrix} 96-100 & 5 \text{ (perfectly)} \\ 90-95 & 5 \text{ (perfectly)} \\ 75-89 & 4 \text{ (good)} \\ 66-74 & 3 \text{ (satisfactorily)} \\ 60-65 & 3 \text{ (satisfactorily)} \\ \hline 35-59 & 2 \text{ (unsatisfactorily)} \\ 1-34 & F \\ \end{bmatrix}$ 14. The quality of the educational process of the specialty.								
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process of the specialty.								-
	14.				discipline can be upd	ated depend	ling on tl	he modern needs
15. Methodical support Basic literature								
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 1. General physics with examples and problems. Part 1. Me Molecular physics and thermodynamics: textbook. manual Storozhenko and others Kharkiv: SMITH Company, 2006 - 320p 2.General physics with examples and problems. Part 2. Electric magnetism: textbook. manual./ IM Kibets and others Kharkiv: Company, 2009-424p .; 3. General physics with examples and problems. Part 3, item 1. textbook. manual / IM Kibets and others H.: SMITH Company, 232p. 4. General physics with examples and problems. Part 3, item 2. Q and atomic physics. Solid state physics. Nuclear physics: textbo Kibets and others H.: SMITH Company, 2013 304p. 			Molecular Storozheni 2.General magnetism Company, 3. General textbook. r 232p. 4. General and atomic	physic co and o physics textbo 2009-42 physics nanual / physics c physic	es and thermodyr thers Kharkiv: SM with examples and ok. manual./ IM Kit 24p .; s with examples and f IM Kibets and other s with examples and es. Solid state physic	amics: tex ITH Compa problems. bets and oth problems. ers H.: SM problems. l cs. Nuclear	xtbook. any, 200 Part 2. ners K Part 3, AITH Co Part 3, it physics	manual./ VO 06 - 320p .; Electricity and Charkiv: SMITH item 1. Optics: ompany, 2012 tem 2. Quantum

		5. A short course in physics. Textbook / IN Kibets et al H .: SMITH
		Company. 2015328p.
		Supporting literature
		1. Collection of tests in the course of physics / O.M. Kovalenko and others
		Kharkiv: KNURE, 2006124p.
		2. Dictionary of physical terms: textbook / T.B. Tkachenko Kharkiv:
		KNURE, 200480p.
		Kitoki, 2001. oop.
		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, 2013152p.
		2. Methodical instructions for software in physics (part 2) / Edited by: VO
		Storozhenko and others. –Kharkiv: KhNURE, 2013140p.
		3. Methodical instructions for laboratory work in physics. Part 1. Mechanics
		and molecular physics. / Edited by: OV Vyshnivetsky and others Kharkiv:
		KNURE, 2009 84p.
		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=undefine
		d T
16.	Syllabus developer	Associate Professor of Physics Kalinin Vitaly Veniaminovich,
		vitaly.kalinin@nure.ua
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