



COURSE SYLLABUS

« Mathematics and physics (physics) »

Degree of higher education - Bachelor

Specialization 101 « Ecology »

Educational programme « Ecology »

Academic year 2023/2024, **semester** 1

Form of study full-time (full-time, part-time)

Number of ECTS credits 2,0

Language of instruction English (Ukrainian, English, German)

Lecturer of the course

candidate of physical and mathematical sciences, associate professor Oksana Godlevska

Contact information of the lecturer (e-mail)

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Course page on eLearn

<https://elearn.nubip.edu.ua/course/view.php?id=2805>

COURSE DESCRIPTION

(up to 1000 printed characters)

The discipline "Mathematics and Physics" is one of the main parts of the theoretical training of bachelors in the specialty 101 "Ecology, Environmental Protection and Balanced Nature Management", that is, the basis without which a full study of the disciplines of the cycle of professional and practical training of such specialists is impossible.

The Purpose of studying the discipline "Physics" is the consistent study by students of the basic laws and provisions of physics in order to understand the general regularities of natural phenomena; the use of these laws in the prompt resolution of problems; illumination of possible applications of physical methods and devices in practical activities.

The tasks of the academic discipline "Physics" are as follows:

Providing students with sufficiently broad training in the field of physics, mastery of fundamental concepts and theories of classical and modern physics, which provides them with effective mastery of special subjects and the further possibility of using physical principles. This also includes teaching students methods and skills for solving specific problems and familiarizing them with measuring equipment. Formation of students' scientific outlook and modern physical thinking. This task should also be considered as an essential part of the humanitarian training of the future specialist, since most issues of the history of science and philosophy can be demonstrated during the teaching of a physics course. As a result of studying the academic discipline "Mathematics and Physics", the student should

know:

basic physical quantities, units of their measurements, basics of error theory and rules for processing measurement results, modern means of measuring physical quantities

- fundamental concepts and theories of classical and modern physics in order to effectively master special educational disciplines and use knowledge of physical laws in future work;

- methods of solving practical physical problems and problems;

- principles of operation of devices;

be able to: - use measuring tools, perform mathematical and statistical processing of measurement results;

- using physical conditions, laws and theories, apply the acquired theoretical and practical knowledge after studying special disciplines in the future work in the specialty;

- explain physical processes and phenomena that occur in the natural environment, as well as during the operation of various types of equipment.

Acquisition of competencies

The study of the academic discipline "Mathematics and Physics" contributes to the fact that, according to this standard, the student is able to acquire:

general competencies:

GC8 Ability to conduct research at the appropriate level.

professional (special) competences:

SC2. Ability to critically understand basic theories, methods and principles of natural sciences

SC3. Understanding the main theoretical provisions, concepts and principles of mathematical and socio-economic sciences.

Program learning outcomes (PLO):

PLO3. Understand the main concepts, theoretical and practical problems in the field of natural sciences, which are necessary for analysis and decision-making in the field of ecology, environmental protection and balanced nature management

PLO19. To raise the professional level through continuing education and self-education.

PLO21. Be able to choose optimal methods and tools for research, data collection and processing.

COURSE STRUCTURE

The structure of the scientific discipline

Names of content modules and topics	Number of hours											
	full-time form						Part-time form					
	total	including					total	including				
		l	p	lab	ind	self		l	p	lab	ind	self
1	2	3	4	5	6	7	8	9	10	11	12	13
Content module 1. Mechanics. Molecular physics and thermodynamics.												
Topic 1.1. Mathematical data processing	7	2	2			3						

Topic 1.2. Kinematics of a material point.	3	1				2						
Topic 1.3. Dynamics of a material point	5	1	2			2						
Topic 1.4. Work and energy.	3	1				2						
Topic 1.5. Dynamics of rotary motion.	5	1	2			2						
Topic 1.6. Molecular kinetic theory of ideal gases.	3	1				2						
Topic 1.7. Fundamentals of hydrodynamics and aerodynamics	5	1	2			2						
Topic 1.8. Basics of thermodynamics.	3	1				2						
Content module 2. Electrostatics and direct electric current Magnetism. Oscillations and waves. Optics. Physics of the atom and atomic nucleus.												
Topic 2.1. Electrostatics	5	1	2			2						
Topic 2.2. Direct current.	4	1	1			2						
Topic 2.3. Magnetic field. The phenomenon of electromagnetic induction.	5	1	2			2						
Topic 2.4. Harmonic oscillations. Waves.	3	1				2						
Topic 2.5. Geometric optics	5	1	2			2						
Topic 2.6. Physics of the atom and atomic nucleus.	4	1				3						
Total hours	60	15	15			30						

ASSESSMENT POLICY

<i>Policy regarding deadlines and resits:</i>	Assignments submitted after the deadline without valid reasons will be graded lower. Resitting of modules will be allowed with the permission from the lecturer and in the presence of valid reasons (e.g. medical reasons).
<i>Academic honesty policy:</i>	Cheating during tests and exams is strictly prohibited (including the use of mobile devices). Coursework and research papers must

	contain correct citations for all sources used.
Attendance policy:	Class attendance is mandatory. In case of objective reasons (such as illness or international internships), individual learning may be allowed (in online format by the approval of the dean of the faculty).

SCALE OF ASSESSMENT OF STUDENT KNOWLEDGE

Student rating, points	National grade based on exam results	
	exams	credits
90-100	excellent	passed
74-89	good	
60-73	satisfactory	
0-59	unsatisfactory	not passed

Recommended sources of information

1. Фізика : підручник для вищих навчальних закладів / Бойко В.В., Булах Г.І.; Гуменюк Я.О., Ільїн, П.П. Національний університет біоресурсів і природокористування України. – К.: "Ліра-К", 2019. – 468 с.
2. Бойко В.В., Булах Г.І., Гуменюк Я.О., Ільїн П.П.; Сукач Г.О. Фізика : Частина II. Електромагнетизм. Електромагнітні коливання та хвилі. Оптика. Елементи квантової фізики, фізики твердого тіла, атома та ядра. навчальний посібник для студентів нефізичних спеціальностей ВНЗ / за ред. В. В. Бойка ; Національний університет біоресурсів і природокористування України. – К. : ВЦ "АЗБУКА", 2020. – 319 с.
3. Біофізика : підручник для студентів вищих навчальних закладів III-IV рівнів акредитації / Посудін Ю.І.; Бойко В.В.; Годлевська О.О.; Залоїло І.А. Національний університет біоресурсів і природокористування України. - К. : Ліра-К, 2020. - 704 с.
4. Навчальний посібник «Практикум з біофізики. Ч.1» (Бойко В.В., Залоїло І.А., Годлевська О.О., Посудін Ю.І.), Національний університет біоресурсів і природокористування України. - К. : Ліра-К, 2021. - 570 с.
5. Годлевська О.О. Методичні вказівки до виконання лабораторно-практичних робіт «Основи біофізики» для студентів вищих аграрних навчальних закладів III-IV рівнів акредитації з напрямів «Екологія та охорона навколишнього середовища», «Екобіотехнологія», «Захист рослин» 2020,-160 стор.
6. V. Boyko, O. Godlevska, P. Iliin, M. Malyuta. "Physics". Methodical recommendations for the students, who attend the English-speaking lectures.-2022, printed NULE of Ukraine, Kyiv , p.52.
7. V.Boyko, P.Iliin, O.Godlevska Навчально-методичні рекомендації: Methodical recommendations for performing laboratory work remotely who attend the English-speaking lectures, 2023, printed NULE of Ukraine, Kyiv ,p. 247.

Інтернет-джерела

Канал Youtube «КАФЕДРА ФІЗИКИ НУБіП УКРАЇНИ» <https://www.youtube.com/channel/UCUQ-x3dx5Lw2SL6w9a6DNDg>.