



## COURSE SYLLABUS

### Physics

**Degree of higher education - Bachelor**

**Specialization** 162 "Biotechnologies and bioengineering"

**Educational programme** Biotechnologies and bioengineering \_\_\_\_\_»

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

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

**Number of ECTS credits** 7

**Language of instruction** English (Ukrainian, English, German)

**Лектор курсу**

**candidate of physical and mathematical sciences, associate professor Oksana Godlevska**

**Контактна інформація  
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**Сторінка курсу в eLearn**

**<https://elearn.nubip.edu.ua/course/view.php?id=3659>**

## **COURSE DESCRIPTION**

**The main objective** of the course "Physics" is to expose principal laws and theses of physics which make it possible to study general regularities of natural phenomena; to apply the principles and methods of the physical sciences to biological problems; to consider the biophysical problems which are concerned with the viability of agricultural objects and their interaction with the environment; to elucidate possible application of physical instrumentation to practice.

The main requirements to the student after studying by him the course "Physics" are the following:

### **The student must know**

the main physical quantities and units, principal laws and theses of general physics, theory and practice of measurement errors;

general physical processes and phenomena which take place in the living organism;

the effects of external physical factors on agricultural objects and their interaction with the environment;

possibility of the application of physical instrumentation to future practice.

### **The student must be able**

to process experimental data and estimate measurement errors;

to explain physical principles and mechanisms of function of living organism;

to use modern physical methods and devices in future practice.

### Acquisition of competencies

The study of the academic discipline "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.

GK10 Ability to evaluate and ensure the quality of performed works.

#### professional (special) competences:

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

#### Program learning outcomes (PLO):

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

### The structure of the scientific discipline

Names of content modules and topics	Full-time form						
	weeks	total	including				
			1	p	lab	individual	self
1	2	3	4	5	6	7	8
<b>Topic 1. Mechanics.</b> Kinematics, dynamics, statics. Elastic properties of bodies.	1-2	14	2		4		8
<b>Topic 2. Biomechanics</b>	2-3	8	2		2		4

<b>Topic 3.</b> Hydrodynamics.	3-4	8	2		2		4
<b>Topic 4.</b> Molecular physics	4-5	8	2		2		4
<b>Topic 5.</b> Acoustics, bioacoustics.	5-7	16	4		4		8
<b>Topic 6.</b> Thermodynamics of equilibrium and irreversible states and processes	7-8	10	4		2		4
<b>Together according to content module 1</b>	64		16		16		32
<b>Topic 1.</b> Electricity, bioelectricity.	9-10	16	4		4		8
<b>Topic 2.</b> Magnetism, biomagnetism.	11-12	16	4		4		8
<b>Topic 3.</b> Geometric, wave optics.	13-14	16	4		4		8
<b>Topic 4.</b> Physiological optics and photobiology	15	8	2		2		4
Together according to content module 2	56		14		14		28
Total hours	120		30		30		60
Course project (work) with _____			-	-	-		-

### ASSESSMENT POLICY

<b><i>Policy regarding deadlines and resits:</i></b>	Assignments submitted after the deadline without valid reasons will be graded lower. Resitting of modules will be allowed with the
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	permission from the lecturer and in the presence of valid reasons (e.g. medical reasons).
<b>Academic honesty policy:</b>	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.
<b>Attendance policy:</b>	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

Posudin Yuriy. *Physics with Fundamentals of Biophysic.*- 2d edition.- Kyiv: Printline, 2014.- 209 p.

Physics\ V. Boyko, O. Godlevska, P.Iiin, M. Malyuta\ Methodical recommendations for the students, who attend the English-speaking lectures, printed NULE of Ukraine, Kyiv. 2021, p.52

Посудін Ю.І. *Лабораторний практикум з дисципліни «Фізика з основами біофізики» для студентів, що слухають лекції англійською мовою.* К.: 2010.-194 с. (для англomовних груп).  
Бойко В.В., Відьмаченко А.П., Залоїло І.А., Мalyюта М.В. *Фізика з основами кваліметрії: Навчальний посібник.* - К.: Видавництво «Ліра– К», 2018, – 564 с.

Практикум з біофізики : навчальний посібник для вищих навчальних закладів. Ч. І. Біомеханіка / В. В. Бойко, І. А. Залоїло, О. О. Годлевська. - К.: , 2021. - 572 с.

Посудін Ю.І. *Фізика з основами біофізики.* Київ, Світ, 2003.-400 с.

Посудін Ю.І. *Лабораторний практикум з дисципліни "Фізика з основами біофізики": Навчальний посібник* - Київ, НУБіПУ, 2012.-105 с.