

Summary of the working program of the academic discipline

«PHYSICS, MATHEMATICS»

(name of the academic discipline)

General Educational Program of higher education (specialist's degree programs)

31.05.03 Dentistry

Department: **MEDICAL BIOPHYSICS**

1. The purpose of mastering the discipline participation in the formation of UC-1 competencies consists in the formation of students' ability to carry out a critical analysis of problem situations based on a systematic approach, to develop an action strategy.

2. Position of the academic discipline in the structure of the General Educational Program (GEP).

2.1. The discipline «Physics, mathematics» refers to the core part of Block 1 (B1.E.9) of GEP HE. The discipline is taught in 1 semester/1 year of study.

3. Deliverables of mastering the academic discipline and metrics of competence acquisition

Mastering the discipline aims at acquiring the following universal (UC) or/and general professional (GPC) or/and professional (PC) competencies

№	Competence code	The content of the competence (or its part)	Code and name of the competence acquisition metric	As a result of mastering the discipline, the students should:		
				know	be able to	possess
1.	UC-1	Able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy	<p><u>ID-1_{UC-1.1}</u> Knows: methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis.</p> <p><u>ID-2_{UC-1.2}</u> Can: acquire new knowledge based on analysis, synthesis; collect data on complex scientific problems related to the professional field; search for information and solutions based on actions, experiment and experience.</p> <p><u>ID-3_{UC-1.3}</u> Has practical experience: research of professional activity samples with the use of analysis, synthesis and other methods of</p>	methodology of abstract thinking for systematization of quantitative and qualitative characteristics of the physiological state of the organism and the surrounding environment	to gain new knowledge based on analysis, synthesis, to identify objective, physical processes in biological systems and to determine their connection with the fundamental laws of physics	the methodology of abstract thinking for making conclusions about the results of measurements of the physical characteristics of biological objects and mathematical processing of the data obtained

			intellectual activity; development of an action strategy for solving professional problems.			
	GPC-8	Able to use basic physical, chemical, mathematical and natural science concepts and methods in solving professional tasks.	<p><u>ID-1_{GPC-8.1}</u> Knows: basic physico-chemical, mathematical and natural science concepts and methods that are used in medicine.</p> <p><u>ID-2_{GPC-8.2}</u> Is able to: interpret the data of the main physiological, mathematical and natural-scientific methods of research in solving professional problems.</p> <p><u>ID-3_{GPC-8.3}</u> He has practical experience in the application of basic physicochemical, mathematical and natural scientific research methods in solving professional problems.</p>	methodology of conducting measurement s of the physical characteristic s of a biological object methodology of mathematical processing of the results of the physical characteristic s of a biological object	to use analog and digital measuring instruments to measure the mechanical properties of liquids, electrical and optical characteristic s of biological objects, dosimetry, to assess the resolution and resolution limit of an optical microscope, to characterize the properties of images ob-tained in the lens, the eye-piece of the microscope, to work with laser technology to find suitable analog and digital measuring instruments, to carry out statistical processing of the results of laboratory measurement s of physical quantities, to evaluate confidence intervals according to	the method of measuring physical quantities with the help of analog and digital measuring instruments, the method of assessing the sins of direct and indirect measurements

					a given confidence value, mode, median of the sample, to build histograms and cumulative distributions, to evaluate the errors of direct and indirect measurements of a physical quantity	
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4. Volume of the academic discipline and types of academic work

Total labor intensity of the discipline is 2 CU (72 AH)

Type of educational work	Labor intensity		Labor intensity (AH) in semesters	
	volume credit (CU)	in units	volume academic (AH)	in hours
Classroom work, including	2		72	
Lectures (L)	0,3		10	
Laboratory practicum (LP)*	<i>FSES are not provided</i>			
Practicals (P)	0,9		34	
Seminars (S)	<i>FSES are not provided</i>			
Student's individual work (SIW)	0,8		28	
Mid-term assessment	<i>FSES are not provided</i>			
CREDIT				
TOTAL LABOR INTENSITY	2		72	

5. Sections of the academic discipline and competencies that are formed

№	Competence code	Section name of the discipline
1.	UC-1, GPC-8	Fundamentals of mathematical analysis
2.	UC-1, GPC-8	Fundamentals of probability theory and mathematical statistics
3.	UC-1, GPC-8	Mechanics of liquids and gases. Acoustics.
4.	UC-1, GPC-8	Electrodynamics. Physical processes in tissues when exposed to current and electromagnetic fields. Fundamentals of medical electronics.
5.	UC-1, GPC-8	Optics. Quantum physics. Ionizing radiation. Basics of dosimetry.