MINISTRY OF EDUCATION AND SCIENCE OF the KYRGYZ REPUBLIC
Government-run Educational Institution of Higher Professional Education
Kyrgyz-Russian Slavic University
Institute of Clinical Medicine and Biomedical Technologies

Endorsed by
the Director, Assoc. Prof. *Abilova S.S.*
04.11.2026 y.

Medical biophysics

Annotation of the Course (Module)

Assigned to the department of Academic Curriculum	**Physics, Medical Informatics and Biology** 560001 – KR General Medicine
Qualification	**Specialist**
Mode of Study	**Intramural**
Total credit value	2 Credit points
The Course outline developed by:	Manzhikova S. Ts.

Course Hours Scheduling (per semester)

Semester Academic Year	**1(1.1)**		**Total**	
Weeks	18			
Type of Training	EP	WP	EP	WP
Lectures	14	14	14	14
Practical Session	16	16	16	16
Learning communication during the period of theoretical training	0,3	0,3	0,3	0,3
Including interactive	2	2	2	2
Total in class Session	30	30	30	30
Auditorium Learning	30,3	30,3	30,3	30,3
Individual work	29,7	29,7	29,7	29,7
Total	60	60	60	60

1. THE PURPOSE OF LEARNING	
1.1	Contribute to the mastery of mathematical apparatus necessary for solving theoretical and practical problems by medical students, the development of students' ability to self-study of mathematical literature and the ability to express the natural science and clinical problems by mathematical language.
1.2	To promote formation by medical students of the system knowledge about the physical properties and physical processes occurring in biological objects, including the human body, necessary for the development of other academic disciplines and the formation of professional medical qualities.
1.3	Formation by students' logical thinking, the ability to formulate accurately the problem, the ability to isolate the main and secondary, the ability to draw conclusions based on the results of measurements.

2. DISCIPLINE AS A PART OF THE STRUCTURE OF B.E.P.	
Cycle (section) OOП:	B1.B
2.1	**Requirements for pre-training of the student:**
2.1.1	School course of physics and mathematics (Know: mathematical methods of solving problems; the basic laws of physics. Be able: to state physical and mathematical laws and theorems. Skills: solve physical and mathematical problems).
2.2	**Disciplines and practices for which the study of this discipline (module) is necessary as a prior:**
2.2.1	Chemistry and Biochemistry
2.2.2	Normal and Pathological Physiology
2.2.3	Medical Informatics
2.2.4	Probative Medicine
2.2.5	Physiotherapy

3. THE COMPETENCE OF THE LEARNER, FORMED AS A RESULT OF LEARNING (MODULE)	
GK – 3 - Capable of independently acquiring new knowledge and applying it practically using modern information technologies in professional activities.	
To know:	
Level 1	key sources of professional information, methods for the independent search and analysis of knowledge, and modern information technologies and their capabilities for addressing professional tasks.
To be able:	
Level 1	- independently locate, analyze, and systematize professional information; - apply modern information technologies to solve standard professional tasks; and critically evaluate the reliability of sources.
To master:	
Level 1	- skills for independently acquiring new knowledge and methods for its practical application using modern information technologies; - and the capacity for continuous self-education and professional development
PK – 5 - Is able and ready to work with medical and technical equipment used in work with patients, to apply the capabilities of modern information technologies to solve professional problems	
To know:	
Level 1	- basic biological concepts - basic scientific medical and biological terminology - the main sources of information, bibliographic resources, the methodology for processing scientific and technical information on the Internet and specialized databases, the main methods of working with specialized software for solving standard problems of professional activity
To be able:	
Level 1	- use biomedical terminology, information and communication technologies, incl. research methods for solving standard problems of professional activity - apply basic research methods to solve professional problems - apply information, bibliographic resources, processing methods, search for scientific and technical information using general and specialized databases and use specialized software when carrying out theoretical calculations and processing experimental data to solve standard problems of professional activity
To master:	

Level 1	- elementary methods of work in a biological, physical, chemical laboratory; general safety rules for handling computers, laboratory equipment and chemical reagents - biomedical and other terminology; skills of mathematical, biological, chemical and biochemical thinking, skills of independent work with reference, educational and scientific literature - skills in working with scientific and educational portals, basic skills in using standard as well as specialized software and databases for statistical processing of research results and presenting them to the scientific community
AK – 1 - Capable of applying fundamental physicochemical, mathematical, and natural science concepts and methods to solve professional problems.	
To know:	
Level 1	fundamental physicochemical, mathematical, and natural-science concepts, laws, and methods necessary for understanding life processes, as well as the diagnosis and treatment of diseases.
To be able:	
Level 1	apply physicochemical, mathematical, and natural science methods to analyze biomedical processes, interpret laboratory data, and solve diagnostic and research problems.
To master:	
Level 1	skills in the integrated application of physicochemical, mathematical, and natural science methods to solve professional problems; the ability to integrate natural science knowledge into clinical practice and scientific research.

As a result of the development of the discipline the student must:

3.1	**To know:**
3.1.1	The most common physical laws underlying the processes occurring in the body.
3.1.2	Physical properties of biological tissues and fluids.
3.1.3	Characteristics of physical factors (medical, climatic, industrial) that affect the body, biophysical mechanisms of such impact.
3.1.4	Physical characteristics of the information at the output of the medical device. Purpose and technical characteristics of the main types of medical equipment, safety when working with equipment.
3.1.5	Fundamentals of differential and integral calculus.
3.1.6	The theory of ordinary differential equations of the first order with separable variables.
3.1.7	Fundamentals of statistical methods in clinical and laboratory experimental studies.
3.2	**To be able to:**
3.2.1	Make physical measurements and statistically process of the results of measurements; extract the necessary information from the results of observations and measurements. Make an analysis research results given in graphical and analytical forms.
3.2.2	Draw up protocols of laboratory work according to the requirements; to describe the meaning of physical quantities, using physical terminology; give a verbal description of the main physical experiments.
3.2.3	Work on laboratory equipment.
3.2.4	Find derivatives and integrals; apply differentials in approximate calculations.
3.2.5	To compose and solve differential equations on the examples of problems of physical, chemical, pharmaceutical and medico-biological content.
3.3	**To master:**
3.3.1	Problem solving skills based on the laws of mathematics.
3.3.2	Skills of the experiment (competently conduct the experiment; clearly represent the purpose of the study; possess various forms of illustrative expression of the results obtained in the experiment – the construction of graphs, polygons, histograms, tables).
3.3.3	Methods of statistical processing of medical and biological information. Data reliability assessment.
3.3.4	Methods of analysis of new scientific and educational literature, experimental results.