

APPROVED:
Confirmed by the Chair session
Protocol No. 7 dated "02" of January, 2024
Head of the Department of Biophysics
Dr. Sci. Prof. Roman FAFULA



PLAN OF LECTURES
in Medical and Biological Physics
for the 1st Year Students of Faculty of Medicine
in the Second Semester of 2023/2024 Academic Year
Group 34

No	TOPIC	Hours	Dates
1.	Biophysics of sensory systems. Biophysics of hearing. Biophysics of visual reception.	2	16.01
2.	Physical principles of electrocardiography and rheography. Influence of electric and magnetic field on a living organism.	2	30.01
3.	Instrumental methods of analysis: optical, spectral and luminescent methods.	2	13.02
4.	Thermal radiation, thermography. Structure, working principle and application of lasers in medicine.	2	27.02
5.	The effect of ionizing radiation on a living organism. Fundamentals of dosimetry. Physical principles of radiation diagnostics and radiation therapy.	2	12.03
<i>In total</i>		10	

Lecturer – Dr. Sci., Prof. Roman Fafula

Coordinator of academic affairs



Associate professor Oksana Malanchuk

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PLAN OF LABORATORY AND PRACTICAL CLASSES
in Medical and Biological Physics
for the 1st Year Students of Faculty of Medicine
in the Second Semester of 2023/2024 Academic Year
Group 34

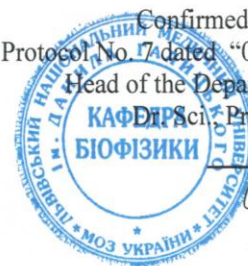
No	TOPIC	Hours	Dates
1	Biophysics of breathing.	2	17.01
2	Biophysics of hearing. Sound diagnostic methods.	2	24.01
3	Biophysics of the vision. Biophysical bases of visual perception. Devices for diagnostics and correction of vision.	2	31.01
4	Influence of mechanical factors on a living organism. Physical principles of ultrasound diagnostics.	2	07.02
5	Physical principles of electrography of tissues and organs. Electrocardiography.	2	14.02
6	Electrical conductivity of cells and tissues. The effect of electric current on the human body. Physical principles of galvanization, electrophoresis and rheography.	2	21.02
7	The effect of alternating electric and magnetic fields of high, ultrahigh and superhigh frequencies on biological objects.	2	28.02
8	Absorption and scattering of light in biological media. Photocolorimetry and spectrophotometry.	2	06.03
9	Polarization of light. Polarimetry. Polarization microscopy.	2	13.03
10	Thermal radiation. Thermography.	2	20.03
11	Induced radiation. The effect of laser radiation on the living organism and its application in medicine.	2	27.03
12	X-rays. Methods of X-ray diagnostics and X-ray therapy in medicine.	2	03.04
13	Radioactive radiation. The effect of ionizing radiation on a living organism.	2	10.04
14	Dosimetry of ionizing radiation. Quantitative evaluation of radio damage. Modification of radiobiological effects.	2	17.04
In total		28	

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SELF-STUDY PLAN
in Medical and Biological Physics
for the 1st Year Students of Faculty of Medicine
in the Second Semester of 2023/2024 Academic Year
Group 34

No	TOPIC	Hours	Dates
1	Photobiological processes. Photomedicine.	2	17.01-23.01
2	Phenomenon of photoeffect and luminescence. Application of luminescence in medicine.	2	24.01-31.01
3	Luminescence: basic regularities, properties. Stokes' law.	2	07.02-13.02
4	Bioluminescence. Chemiluminescence and its diagnostic value. Photoluminescence.	2	14.02-20.02
5	Laser devices: rules of safe operation. Biological effects of laser radiation on body tissues.	2	21.02-27.02
6	Resonance methods of quantum mechanics. NMR tomography.	5	28.02-19.03
7	X-ray imaging, sources of X-ray radiation. Radiography. Mammography. Angiography. Computed tomography. Storage formats and image analysis tools.	4	20.03-02.04
8	Protection against ionizing radiation.	3	03.04-17.04
In total		22	

Literature:

1. Chalyi A.V., Tsekhmister Ya.V., Agapov B.T. Medical and Biological Physics: textbook for the students of higher medical institutions of the IV accreditation level. – Vinnytsia, Nova Knyha, 2010. – 480 p.
2. Davidovits P. Physics in biology and medicine. 5th ed. – Amsterdam: Elsevier Academic Press, 2019. – 377 p.
3. Herman I.P. Physics of the Human Body. Springer, 2008. – 860 p.
4. Hobie R.K., Roth B.J. Intermediate Physics for Medicine and Biology. Springer, 2007. – 616 p.
5. Medical and Biological Physics: Laboratory Manual for students of higher medical institutions of the IV accreditation level // Lychkovsky E., Fafula R., Fedorovych Z., Makar N., Odnorih L. – Lviv, Danylo Halytsky Lviv National Medical University, 2014. – 300 p.
6. Newman J. Physics of the Life Sciences. Springer, 2008. – 718 p.

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