

MINISTRY OF HEALTH OF UKRAINE
KHARKIV NATIONAL MEDICAL UNIVERSITY

Department of Medical and Biological Physics and Medical Informatics
Academic year: 2021-2022

SYLLABUS OF THE EDUCATIONAL COMPONENT

«MEDICAL EQUIPMENT IN DIAGNOSIS AND TREATMENT»

Normative or selective educational component selective

Form of education full-time
(full-time, part-time, remote)

Field of knowledge 22 "Health care"
(code and name of the direction of training)

Major field 223 "Nursing"
(code and name of the specialty)

Specialization (if present) _____

Educational professional program "Nursing"

The first (bachelor's) level of higher education 4 years of study

Year: 1

This syllabus was approved at the meeting of the department of medical and biological physics and medical informatics

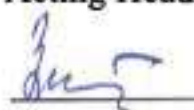
Approved by the methodological committee on international students training (KhNMU)

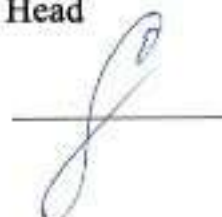
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31 August 2021,

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INTRODUCTION

Syllabus of the educational component "Medical equipment in diagnosis and treatment" compiled in accordance with the educational and professional program (hereinafter - OPP) "Nursing" and the Standard of Higher Education of Ukraine (hereinafter - Standard), the first (bachelor's educational and scientific) level of higher education, field of knowledge 22 "Health," specialty 223 "Nursing."

Educational component description (annotation). The educational component "Medical equipment in diagnosis and treatment" is offered for study by applicants for education of the 1st year and is selective. The volume of the educational component (in ECTS loans with the definition of the distribution of hours for practical training and SRS): 3 ECTS loans, 90 hours, of which 32 hours of practical training and 58 hours of SRS. Type of control - Offset. The educational component "Medical equipment in diagnosis and treatment" is selective.

Subject of study of the educational component "Medical equipment in diagnosis and treatment" is basic physical concepts, laws, principles and approaches in the study of wildlife processes, physical and technical principles of functioning of medical devices, which are an integral part of the professional competence of the future specialist, as well as the basis for studying professionally-oriented natural and clinical educational components in medical universities of Ukraine.

Interdisciplinary connections.

Educational component "Medical equipment in diagnosis and treatment":

- based on the study of a number of other educational components: "Fundamentals of biological physics and medical equipment," "Fundamentals of medical biology and microbiology," "Biological chemistry";
- lays the foundations for the study of a number of other educational components: Clinical Pharmacology, Fundamentals of Radiology in Nursing, Nursing in Cardiology, Medical and Bioorganic Chemistry;
- promotes the study of other fundamental as well as clinical, hygienic and social educational components;

In the general system of training of the future specialist, the educational component "Medical equipment in diagnosis and treatment" refers to the cycle of natural science training.

Prerequisites.

The study of the educational component "Medical equipment in diagnosis and treatment" involves the preliminary or simultaneous assimilation of credits from the educational components "Biological Chemistry," "Clinical Pharmacology," "Fundamentals of Biological Physics and Medical Equipment."

Postrequisites.

The main provisions of the educational component "Medical equipment in diagnosis and treatment" should be used in the study of such educational components as "Nursing in cardiology," "Medical and bioorganic chemistry," "Fundamentals of medical biology and microbiology," "Fundamentals of radiology in nursing."

Link to the discipline page in MOODLE:

<https://distance.knmu.edu.ua/course/view.php?id=5084>

1. PURPOSE AND OBJECTIVES OF THE EDUCATIONAL COMPONENT

1.1. The purpose of teaching the educational component there is the formation of a system of knowledge and new competencies for higher education applicants about basic physical concepts, laws, principles and approaches to the study of wildlife processes, physical and technical principles of the functioning of medical devices. This all forms the basis of subject competencies in medical equipment in diagnosis and treatment, and is an integral part of the professional competence of the future specialist, as well as the basis for studying professionally oriented natural and clinical disciplines in medical universities of Ukraine.

1.2. The main tasks of studying the educational component is the acquisition by applicants for education of competencies in accordance with the general and professional competencies of the educational and professional program "Nursing" of the first (bachelor's) level of higher education in the specialty 223 Nursing.

1.3. Competencies and learning outcomes, the formation of which is facilitated by the educational component "Medical equipment in diagnosis and treatment" (the relationship with the normative content of the training of applicants for higher education, formulated in terms of the results of training in the OPP and the Standard).

1.3.1. The study of the educational component ensures the acquisition of competencies by applicants for education:

- integral

the ability to solve typical and complex specialized problems and practical problems in professional activities in the field of health and/or in the process of further training using modern physical theories and methods of studying living organisms, biological objects and processes occurring in living nature using a complex of interdisciplinary knowledge and in conditions of insufficient information.

- general:

the ability to apply knowledge of biological physics in practical situations. Ability to understand the principles and methods of graphic and analytical presentation of scientific information. Ability to use information technology to study biomedical processes. The ability to acquire new knowledge and be modern educated, to realize the possibility of learning throughout life. Ability to work both independently and in a team. Life safety skills. The desire to preserve the natural environment and ensure the sustainable development of society. Recognition of the moral and bioethical aspects of scientific research and the need for intellectual integrity, as well as professional codes of conduct.

- special (professional, subject):

the ability to replenish knowledge and understanding of the basic physical characteristics of biomedical systems, the physical foundations of processes occurring in living organisms. Ability to integrate basic knowledge of physics, chemistry, biology, mathematics, information technology to create the foundation of professional competencies. Ability to collect, record and analyze biomedical research data through appropriate methods and technological means. Ability to apply quantitative methods in the study of biomedical processes. The ability to interpret the general physical and biophysical patterns underlying the functioning of the human body. The ability to explain the physical basis and biophysical mechanisms, the effects of the interaction of physical fields (in particular permanent, electromagnetic) with the human body. Ability to explain the physical basis of the functioning and application of electronic medical devices. Ability to analyze the composition and physical principles of action of medical devices and equipment. Knowledge and use of theories, paradigms, concepts and principles specific to biological and medical physics. Ability to plan, organize and conduct biomedical research and reporting.

1.3.2. The study of the educational component "Medical equipment in diagnosis and treatment" ensures that applicants for education acquire the following program learning outcomes (PLO):

PLO 2. Conduct nursing diagnostics: Identify and evaluate patient problems.

In the conditions of the HCF, at home, in predictable circumstances, to be able to identify the real problems of the patient, assess their priority and establish a nursing diagnosis.

PLO 4. Monitor the work of junior medical personnel and the condition of the inventory. In terms of health protection in accordance with official duties, in order to comply with the sanitary and anti-epidemic regime, be able to:

- train junior medical staff in the performance of functional duties and labor protection; monitor compliance with safety rules by junior medical personnel;
- supervise the work of junior medical personnel; monitor the implementation of internal regulations by staff and patients; monitor compliance with hygiene measures in wards and medical offices.

PLO 14. Be able to prepare the patient, collect and send biological material for laboratory and instrumental examination.

PLO 20. Properly maintain appropriate medical documentation.

1.3.3. The study of the educational component "Medical equipment in diagnosis and treatment" provides the acquisition of the following social skills by applicants for education (soft skills):

communicativity (implemented through: the method of working groups and brainstorming during the analysis, clinical cases, the method of presenting the results of independent work and their protection in the group),

- teamwork (implemented through: group work method and brainstorming during analysis, clinical cases),
- conflict-management (implemented through: business games),
- time management (implemented through: method of self-organization during classroom work in groups and independent work),
- leadership skills (implemented through: method of presenting the results of independent work and their protection in the group).

**2. INFORMATION VOLUME OF EDUCATIONAL COMPONENT
"MEDICAL EQUIPMENT IN DIAGNOSIS AND TREATMENT"**

Name of indicators	Branch of knowledge, specialty, educational degree, OPP	Characteristics of the educational component
		full-time training
number of credits – 3,0	Branch of knowledge 22 Health care (cipher and name)	selective
Total number of hours - 90	Specialty: 223 Nursing (cipher and name)	Year of education:
		1 st
		Semester
Full-time hours: classroom – 32 self-study - 58	Qualification level: <u>The first (bachelor) level of higher education</u>	Lectures
		0 hours
		Classes
		32 hours
		Laboratory works
		0 hours
		Self-study
		58 hours
Individual tasks: 0 hours.		
Type of control: credit		

2.1 Educational component description:

2.1.1 Lectures

№	Topic name	Number of hours	Type of lectures
	Total hours	0	

2.1.2 Seminar classes

№	Topic name	Number of hours	Methods of teaching	Form of control
	Total hours	0		

2.1.3 Practical classes

№	Topic name	Number of hours	Methods of teaching	Form of control
1	Viscoelastic properties of biological tissues. Methods for investigating the flow of viscous fluids.	2		
2	Acoustics. Sound methods in medicine (diagnostic and therapeutic). Ultrasound and its	2		

	use in diagnosis and treatment. Infrasonic, noise and vibration, their negative impact on biological objects.		presentation on the platform Google meet, story-explanation, conversation	test control (Moodle platform)		
3	Biophysical methods of studying the peculiarities of taste, smell and touch.	2				
4	Types of electronic medical equipment (diagnostic and therapeutic).	2				
5	Electrical and magnetic properties of biological tissues and fluids. Diagnostic and therapeutic methods when exposed to electric currents (constant, pulsed and alternating) on biological objects.	6				
6						
7						
8	Medical equipment for the diagnosis and treatment of biological objects under the influence of electromagnetic fields.	2				
9	Use of optical methods for diagnostic and therapeutic purposes.	4			presentation on the platform Google meet, story-explanation, conversation	test control (Moodle platform)
10						
11	Diagnostic technique "thermography," its physical basis.	2				
12	Radiation and absorption of energy by atoms and molecules. Use of resonance methods for diagnostic purposes (MRI technique). Induced radiation. Lasers. Use in medicine.	4				
13						
14	Ionizing radiation and its effect on biological objects. Varieties of modern diagnostic methods (RCT, SPECT, PET, Angiography, etc.) and medical methods (with radiation therapy).	4				
15						
16	Final control. Credit	2	test control (Moodle platform)			
	Total hours	32				

2.1.4 Laboratory works

№	Topic name	Number of hours	Methods of teaching	Form of control
	Total hours	0		

2.1.5 Self-study

№	Topic name	Number of hours	Methods of teaching	Form of control
1	Fundamentals of biomechanics and materials science.	6	electronic information	test control as a component of the final control (Moodle platform)
2	Decrement and logarithmic decrement of vibration amplitude attenuation. Resonance phenomenon. Self-oscillation. Relaxation fluctuations. Wave processes and their characteristics. Wave equation. Flow of energy. Physical and physiological characteristics of sound waves. Curves of equal volume. Human hearing apparatus. Hygienic regulation of noise, infrasound, vibration levels.	10		
3	Biological thermodynamics. Thermodynamic method of studying biomedical systems. The first, second and third laws of thermodynamics, thermodynamic potentials. Entropy. Negentropy. Elements of molecular biophysics.	8		
4	Magnetic phenomena. Elements of magnetobiology. Effect of magnetic field on biological objects. Biomagnetism. Magnetocardiography. Hygienic regulation of electromagnetic fields.	6		
5	Basic concepts and formulas of wave optics (interference and diffraction of light).	6		
6	Interaction of light with matter (light scattering and light dispersion).	6		
7	Basic concepts and laws of quantum physics. Spectroscopy. Electron microscope.	8		
8	Basic concepts of radiobiology.	8		
	Total hours	58		

3. ASSESSMENT CRITERIA

3.1 Assessment of the success of education of applicants is carried out on the basis of the current "Instructions for assessing the educational activities of applicants for education of KhNMU.

Control methods:

Oral and written control of mastering the topic is carried out in practical classes.

Control of obtaining practical skills and abilities is carried out in practical classes by observation.

Control over the performance of independent work is carried out in writing (written form implies presentation both in paper and/or electronic form) and orally.

Current control is carried out at each practical lesson in accordance with the specific goals of the topic. The types of standardized control of theoretical training and control of the assimilation of practical skills are used in all practical classes: computer tests, the performance of practical tasks, including competence-oriented ones.

Final control involves the use of computer tests on the MOODLE remote platform to test the level of theoretical knowledge and the formation of practical skills in the process of performing a practical task on a computer.

The assessment for each practical lesson in the educational component is comprehensive, including the control of the theoretical and practical training of the applicant for higher education, is set by the teacher on a traditional four-point scale in the ACS, which is then converted into the corresponding points.

Criteria for evaluating the final control on the MOODLE remote platform.

The final control contains 25 questions, including:

15-19 correct answers - 15-19 points - rating "3,"

20-23 correct answers - 20-23 points - rating "4,"

24-25 correct answers - 24-25 points - rating "5."

Assessment of the current educational component (CEC):

After the last practical lesson and the assessment in the electronic journal, the ACS calculates the average score of the applicant for education for the year, and if there is no academic debt/missing classes, the credit is set. The conversion of the average grade for current activities into a multi-point scale is carried out in the ACS in accordance with the "Instructions for assessing the educational activities of applicants for education of KhNMU," approved by the Order of KhNMU of 21.08.2021 No. 181. (Table 1).

Table 1

**Conversion of the average assessment for current activities into a 200-point scale
(for the educational component, which ends with credit)**

4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale
5	200	4.3-4,31	172	3.6-3,61	144
4.97-4,99	199	4,27-4,29	171	3.57-3,59	143
4.95-4,96	198	4.24-4,26	170	3.55-3,56	142
4.92-4,94	197	4.22-4,23	169	3.52-3,54	141
4.9-4,91	196	4.19-4,21	168	3.5-3,51	140
4.87-4,89	195	4.17-4,18	167	3.47-3,49	139
4.85-4,86	194	4.14-4,16	166	3.45-3,46	138
4.82-4,84	193	4.12-4,13	165	3.42-3,44	137
4.8-4,81	192	4.09-4,11	164	3.4-3,41	136
4.77-4,79	191	4.07-4,08	163	3.37-3,39	135
4.75-4,76	190	4.04-4,06	162	3.35-3,36	134
4.72-4,74	189	4.02-4,03	161	3.32-3,34	133
4.7-4,71	188	3.99-4,01	160	3.3-3,31	132
4.67-4,69	187	3.97-3,98	159	3.27-3,29	131
4.65-4,66	186	3.94-3,96	158	3.25-3,26	130
4.62-4,64	185	3.92-3,93	157	3.22-3,24	129
4.6-4,61	184	3.89-3,91	156	3.2-3,21	128

4.57-4,59	183	3.87-3,88	155	3.17-3,19	127
4.54-4,56	182	3.84-3,86	154	3.15-3,16	126
4.52-4,53	181	3.82-3,83	153	3.12-3,14	125
4.5-4,51	180	3.79-3,81	152	3.1-3,11	124
4.47-4,49	179	3.77-3,78	151	3.07-3,09	123
4.45-4,46	178	3.74-3,76	150	3.05-3,06	122
4.42-4,44	177	3.72-3,73	149	3.02-3,04	121
4.4-4,41	176	3.7-3,71	148	3-3,01	120
4.37-4,39	175	3.67-3,69	147	less than 3	isn't enough
4.35-4,36	174	3.65-3,66	146		
4.32-4,34	173	3.62-3,64	145		

3.2 Evaluation of individual tasks of applicants for education.

Not provided by the curriculum.

3.1.3. Assessment of the educational component "Medical equipment in diagnosis and treatment."

The score is determined by points on CEC and ranges from 120 to 200 points.

The correspondence of scores on a 200-point scale in accordance with the ECTS scale and to a four-point scale is shown in Table 2.

Table 2

Compliance of scores on a 200-point scale to the ECTS scale and to a 4-point (national) scale

Evaluation on 200-point scale	ECTS score	Evaluation on 4-point scale
180–200	A	excellent
160–179	B	good
150–159	C	good
130–149	D	satisfactory
120–129	E	satisfactory
less 120	F, Fx	unsatisfactory

The applicant for education receives a mark "enrolled" in the test book if he scored from 120 to 200 points.

3.2. Questions to the credit:

Not provided by the curriculum.

3.3 Questions to the final control:

1. Acoustics, acoustic waves. Physical (objective) characteristics of sound. Physiological (subjective) characteristics of sound. Weber-Fechner law. Curves of equal volume, the threshold of audibility of sound and the threshold of pain.
2. Sound research methods (audiometry, auscultation, percussion, phonocardiography and ultrasound diagnosis). Ultrasound and its use in medicine.
3. Infrasound and its impact on biological objects.
4. Biophysical foundations of human perception of sound.
5. Ideal and real fluids. Bernoulli equation, jet continuity equation. Viscosity of the liquid. Newton's formula for the viscous friction force. Newtonian and non-Newtonian fluids. Reynolds number. Laminar and turbulent fluid flow. Poiseil's formula. Hydraulic resistance. Newton's formula for

- the viscous friction force in rheological characteristics. Flow curves. Model Shvedova-Bingama. Kesson's model.
6. The work and power of the human heart. Pulse wave.
 7. Mechanisms (types) of transport of substances through biological membranes. Diffusion, types of diffusion in biological cells. Substance flow, substance flow density. Fick's equation. Nernst-Planck equation. Ion pumps. Membrane potentials - resting potential, action potential. Goldman-Hodgkin-Katz equation.
 8. Electric and current dipoles. Dipole moments of electric and current dipoles.
 9. The main postulates of the second theory of Einthoven's electrocardiography. The concept of an electrocardiogram. Electrocardiographic leads. Analysis of normal electrocardiogram in the second standard lead. The concept of vector cardiography. Electrographic diagnostic methods.
 10. Electroconductive properties of biological tissues for alternating current, their impedance and its components. Dependence of tissue impedance module on AC cyclic frequency. Electrical equivalent of biological tissue. Coefficient of dispersion.
 11. The main mechanism of action of direct electric current on biological tissues. Physiotherapeutic methods using electric direct current (galvanization, drug electrophoresis).
 12. Pulsed electric current, its characteristics. The main mechanism of action of pulsed electric current on biological tissues. Dubois-Raymond law. Electrodiagnosis in medicine. Horweg-Weiss-Lapik equations, concepts of rheobase and chronaxia. Therapeutic techniques based on the use of pulsed current (pacing, electrosleep, electric gymnastics of muscles, defibrillation).
 13. Alternating electric current, its characteristics. Mechanisms of AC action on biological tissues depending on its frequency. Nernst's law. Therapeutic techniques based on the use of alternating current (rheography (impedance-plethysmography); diathermy (electrosurgery), its varieties (diathermotomy and diathermocagulation); local darsonvalization).
 14. The main mechanism of action of the alternating electromagnetic field on biological tissues. Physiotherapeutic methods using an alternating electromagnetic field (inductothermy, UHF therapy, microwave therapy (ICD and DCC therapy)).
 15. The main mechanism of action of a constant electric field on biological tissues. Physiotherapeutic methods using a constant electric field (aeroionotherapy, franklinization).
 16. Hygienic regulation of electromagnetic field levels.
 17. Laws of reflection and refraction of light. Absolute and relative refractive indices of light. The phenomenon of the limit refraction of light, the limit angle of refraction. The phenomenon of complete internal reflection, the limit angle of complete reflection.
 18. Light guides, endoscopes and laparoscopes, their use in medicine.
 19. Lenses and their characteristics. Building images of an object in the collecting and scattering lenses. The formula of a thin lens and the linear magnification of an object in the lens. Types of lens aberrations (spherical aberration, chromatic aberration, astigmatism, distortion).
 20. Optical microscope, the course of the rays in it. Angular magnification of the optical system. Microscope magnification. Microscope resolution. Microscope discrimination limit (at normal and inclined incident of rays on the object). Ways to reduce the optical microscope discrimination limit.
 21. Ultraviolet microscope, features of the principle of action.
 22. Special microscopy methods: microprojection and micrography; dark field method; phase contrast method; polarization and luminescence microscopy.
 23. Optical systems of the human eye: light-conducting and light-receiving. Optical power of the human eye. The process of accommodation, the distance of the best vision. Building an image of an object in the optical system of the human eye. Disadvantages of the light-conducting and light-receiving systems of the human eye, their correction. Photoreceptors, their types. The process of dark adaptation, its mechanisms. The angle of view, the smallest angle of view, the boundary of the human eye. Resolution of the eye. Visual acuity.
 24. The method of polarimetry and its use in medicine. Polarization microscope.
 25. Luminescence and its types. The mechanism of photoluminescence, its types (fluorescence and

- phosphorescence). Stokes's law and deviation from it (anti-Stokes luminescence). Luminescence spectra. Luminescent analysis and its use in biomedical research.
26. Induced radiation. Biological effect of laser radiation. Types of lasers. Application of lasers in medicine.
 27. The phenomenon of electron paramagnetic resonance (EPR). Information carried by EPR spectra. Spin marks and spin probes.
 28. Nuclear magnetic resonance (NMR) phenomenon. NMR introscopy (diagnostic technique of magnetic resonance imaging (MRI)).
 29. Electron microscope, discrimination limit and electron microscope resolution.
 30. Ionizing radiation, the main types of ionizing radiation.
 31. Braking and characteristic X-rays. Mechanism of occurrence of braking X-rays. Minimum wavelength in the spectrum of inhibitory X-rays. Mechanism of occurrence of characteristic X-ray radiation. Spectrum of characteristic X-ray radiation. Moseley's law.
 32. X-ray tube. X-ray flux generated by the X-ray tube.
 33. Attenuation of the flow of monochromatic X-ray radiation by matter, Booger's law.
 34. Mechanisms of X-ray interaction with matter: coherent scattering, incoherent scattering (Compton effect), internal photoelectric effect.
 35. Total X-ray attenuation coefficient, its components. Mass attenuation coefficient of X-rays.
 36. Protection from X-ray radiation.
 37. X-ray diagnostics (digital radiography, X-ray computed tomography (RCT)) and X-ray therapy.
 38. Radioactivity. Types of radioactive decay: α -decay, β -decay, γ -decay, e-capture.
 39. The law of radioactive decay. The half-life of the substance. Activity of the substance, units.
 40. Interaction of various types of ionizing radiation with matter.
 41. Mechanisms of interaction - radiation with matter: incoherent scattering (Compton effect), photoelectric effect, formation of electron-positron pairs.
 42. Attenuation of the flow of monochromatic - radiation by matter, Booger's law.
 43. Characteristics of interaction of corpuscular ionizing radiation with matter: linear density of ionization, linear braking ability, average linear mileage of the particle. Penetrating ability of ionizing radiation.
 44. The negative nature of the impact of ionizing radiation on biological objects.
 45. Methods of protection against ionizing radiation.
 46. Radiation doses (absorbed dose, exposure dose, equivalent dose), units of measurement. Effective equivalent dose.
 47. Radiation dose rate, exposure dose rate, units of measurement.
 48. Hygienic standardization of radiation loads. Internal irradiation of a person.
 51. Detectors and dosimeters of ionizing radiation.
 52. Radionuclide diagnostics: dynamic and static methods.
 53. Single photon emission computed tomography (SPECT). Positron emission tomography (PET).
 54. Radiation therapy and its methods.
 55. Apparatus for radiosurgical treatment.
 56. Direct and indirect effects of ionizing radiation on DNA and other biomacromolecules.
 57. Oxygen effect. Oxygen gain.
 58. Types of radiation damage to DNA cells.
 59. Reproductive and interphase death of irradiated cells.
 60. Survival of irradiated cells, survival curve, its analysis.

3.4. Individual tasks:

Not provided by the curriculum.

3.5 Assessment Appeal Rules:

If the applicant for education does not agree with the assessment received in the classroom, he can challenge it. In this case, knowledge will be evaluated by a commission consisting of the head or head

teacher of the department, an independent teacher and a teacher of the group in which he is studying. To increase the score for classes, the teacher of the group can offer the applicant for education to write an essay or perform an individual task.

4. EDUCATION COMPONENT POLICY

Для успішного засвоєння освітнього компонента необхідно, щоб здобувач освіти систематично готувався до практичних занять, виконував завдання, що пропонуються для засвоєння тем, рекомендованих для самостійного вивчення, читав рекомендовану літературу, брав активну участь в обговоренні теми заняття (в аудиторії / дистанційно).

Відвідування практичних занять з дисципліни є обов'язковим (за виключенням поважних причин). Заняття, що пропущене з будь-якої причини, має бути відпрацьовано. Неприпустимо запізнюватися на заняття. До моменту початку заняття здобувач освіти повинен бути переодягнений у медичний халат. При спілкуванні з викладачем та оточуючими він повинен виявляти ввічливість, розмовляти тихо і поводити себе спокійно.

For successful assimilation of the educational component, it is necessary that the applicant for education systematically prepare for practical classes, perform tasks proposed for assimilation of topics recommended for independent study, read the recommended literature, take an active part in discussing the topic of the lesson (in the audience/remotely).

Attendance of practical classes in the discipline is mandatory (except for valid reasons). A lesson that is missed for any reason must be worked out. It is unacceptable to be late for classes. By the time classes begin, the applicant for education should be dressed in a medical gown. When communicating with the teacher and others, he must show courtesy, talk quietly and behave calmly.

5. ACADEMIC INTEGRITY

Observance of academic integrity by the applicant for education involves:

independent performance of training tasks and tasks for final control of training results; links to sources of information in case of using ideas, statements, information; compliance with copyright law; providing reliable information about the results of their own educational (scientific, creative) activities.

Violation of academic integrity is plagiarism, cheating, deception, falsification, etc.

For violation of academic integrity, applicants for education may be brought to the following responsibility: repeated passing of the assessment (final control, offset); re-passing the educational component; deductions from ZVO.

6. RECOMMENDED LITERATURE

Basic

1. Medical and Biological Physics: textbook for students studying the subject in English: in 2 parts/ V.G. Knigavko, O.V. Zaytseva, M.A. Bondarenko. – Kharkiv: KhNMU, 2012, 4th edition – Lectures. – 556 p.
2. Medical and biological physics: textbook for the students of higher medical establishments of the IV accred. level / Edited by Alexander V. Chalyi. - Third edition. - Vinnytsia: Nova Knyga, 2017. - 480 p.
3. Medical and biological physics: nat. textbook for students. higher honey. (pharm.) textbook. institution. III-IV years accred. / for ed. O.B. Chaly [Chaly OV, Tsekhmister YV, Agapov BT,

Chaly KO, Stuchinskaya NV, Melenevskaya AV, Murashko MI, Oliynyk OI, Radchenko NF]. - 2nd view. - Vinnytsia: Nova Kniga, 2017. - 528 p.

4. Gogia, S. B. Fundamentals of Telemedicine and Telehealth. 2019. Elsevier Science. Available at: <https://www.perlego.com/book/1832437/fundamentals-of-telemedicine-and-telehealth-pdf>
5. F. Heston T. Introductory Chapter: Telemedicine [Internet]. Telehealth. IntechOpen; 2019. Available from: <http://dx.doi.org/10.5772/intechopen.82419>
6. Handbook of Biomedical Informatics: https://en.wikipedia.org/wiki/Book:Handbook_of_Biomedical_Informatics
7. Shortiffe E.H. Biomedical Informatics: Computer Applications in Health Care and Biomedicine 4-th edition / Edward H. Shortiffe, James J. Cimino // New York: Springer. 2019. – 1037 p.

Auxiliary

1. L. Ridgway Scott, Ariel Fernandez. A Mathematical Approach to Protein Biophysics (Biological and Medical Physics, Biomedical Engineering). – Springer Publishing AG, 2017. – 290 p.
2. Ph. Nelson. Biological physics: energy, information, life. Student edition, University of Pennsylvania, 2021. 556 p.
3. L. Ridgway Scott, Ariel Fernandez. A Mathematical Approach to Protein Biophysics (Biological and Medical Physics, Biomedical Engineering). – Springer Publishing AG, 2017. – 290 p.
4. Maqbool M. An Introduction to Medical Physics. – Springer, 2017. – 416 p.
5. Introduction to Medical Physics / Ed. by S. Keevil, R. Padovani, S. Tabakov, T. Greener, C. Lewis. – CRC Press, 2022. – 500 p.
6. S. A. Kane, B. A. Gelman. Introduction to Physics in Modern Medicine. – CRC Press, 2020. – 450 p.

7. INFORMATION RESOURCES

1. Link to the educational component page in the MOODLE system: <https://distance.knmu.edu.ua/course/view.php?id=5084>
2. Page of the Department of Medical and Biological Physics and Medical Informatics on the University website: <https://knmu.edu.ua/departments/kafedra-medychnoyi-ta-biologichnoyi-fizyky-i-medychnoyi-informatyky/>
3. Section of the Department of Medical and Biological Physics and Medical Informatics in the Repository of KhNMU: <http://repo.knmu.edu.ua/handle/123456789/162>.

8. ANOTHER

Regulations on academic integrity and ethics of academic relations at Kharkiv National Medical University

http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_ad_etyka_text.pdf

The order of conducting classes on in-depth study by students of the Kharkov National Medical University of individual disciplines in excess of the volume of the curriculum

http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/nak-poriad-pogl-vyv-dysc.docx

Regulations on the Commission on Academic Integrity, Ethics and Conflict Management of KhNMU

http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_komis_ad_text.pdf

Regulations on the recognition of the results of non-formal education at Kharkiv National Medical University http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/polog_neform_osv.pdf

INCLUSIVE EDUCATION:

http://www.knmu.kharkov.ua/index.php?option=com_content&view=article&id=7108%3A2021-03-10-14-08-02&catid=12%3A2011-05-10-07-16-32&Itemid=33&lang=uk

ACADEMIC INTEGRITY:

http://www.knmu.kharkov.ua/index.php?option=com_content&view=article&id=2520%3A2015-04-30-08-10-46&catid=20%3A2011-05-17-09-30-17&Itemid=40&lang=uk

http://files.knmu.edu.ua:8181/upload/redakt/doc_uchproc/kodex_AD.docx