ЛД-21-ИН

Federal State Budgetary Educational Institution higher education
"NORTH-OSSETIAN STATE MEDICAL ACADEMY"
Ministry of Health of the Russian Federation

УТВЕРЖДАЮ
Ректор
О.В. Ремизов
« 30 » марта 2022 г.

WORKING PROGRAM OF EDUCATIONAL DISCIPLINE
INFORMATION TECHNOLOGY IN MEDICINE

the main professional educational program of higher education
−the specialty program in the specialty **31.05.01 Medical care**,
approved on **30.03.2022**

Form of education _____ **Full-time** _____

Term of training _____ **6 years** _____

Department <u>Chemistry and physics</u>

Vladikavkaz 2022

When developing a discipline program, the program includes:

1. Federal State Educational Standard for the specialty 31.05.01 General Medicine, approved by the Ministry of Education and Science of the Russian Federation on "12" August 2020 No. 988

2. Educational plans of EP HE in the specialty 31.05.01 Medical business,

   (ЛД-21-02-22ИН), (ЛД-21-01-21ИН),

approved by the Academic Council of the Federal State Budgetary Educational Institution of the Ministry of Health of the Russian Federation 30 .03.2022, Protocol No. 6

The working program of the discipline "Information technologies in medicine", approved at the meeting of the department of chemistry and physics on 08.02. 2022 Protocol No. 7

The work program of the discipline was approved at a meeting of the central coordinating educational and methodological council on 22.03. 2022 Protocol No.4

The working program of the discipline was approved by the Academic Council of the Federal State Budgetary Educational Institution of Higher Education NOSMA of the Ministry of Health of Russia on 30.03.2022 Protocol No. 6

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Content of the work program

1. the name of the discipline;
2. a list of the planned learning outcomes in the discipline, correlated with the planned results of mastering the educational program;
3. an indication of the place of discipline in the structure of the educational program;
4. the amount of discipline in credit units, indicating the number of academic or astronomical hours allocated for contact work of students with a teacher (by type of training) and for independent work of students;
5. the content of the discipline, structured by topics (sections) with an indication of the number of academic or astronomical hours allocated for them and types of training;
6. a list of educational and methodological support for independent work of students in the discipline;
7. fund of evaluation means for the intermediate certification of students in the discipline;
8. a list of basic and additional educational literature necessary for mastering the discipline;
9. a list of resources of the information and telecommunication network "Internet" (hereinafter referred to as the "Internet" network) necessary for mastering the discipline;
10. guidelines for students on the development of the discipline;
11. a list of information technologies used in the implementation of the educational process in the discipline, including a list of software and information reference systems (if necessary);
12. Description of the material and technical base required for the implementation of the educational process in the discipline.
13. Conducting educational activities using e-learning and distance learning technologies

1. Перечень планируемых результатов обучения по дисциплине и результаты освоения образовательной программы

п/п №	No. competence	Name of the section of the educational disciplines	Development results know	Indicators of competence achievement	Development results		
					to know	be able to	to own
1	2	3	4	5	6	7	6
1.	**ОРК- 10**	The ability to solve standard tasks of professional activity using information, bibliographic resources, medical and biological terminology, information and communication technologies, taking into account the basic requirements of information security	Biomedical Signal Analysis - Digital signals and images	ID-1 OPK-10 Uses modern information and communication tools and technologies in professional activities.	theoretical foundations of medical informatics	use educational, scientific, popular science literature,	basic technologies of information transformation, graphic, text, table editors, Internet search.
2.	**ОРК- 10**	The ability to solve standard tasks of professional activity using information, bibliographic resources, medical and biological terminology, information and communication technologies, taking into account the basic	Digital images in MATLAB and their application in medical research	ID-1 OPK-10 Uses modern information and communication tools and technologies in professional activities.	Functional transformations of signals.	use technical means, install and remove programs, connect basic PC elements	skills of working with the MATLAB package

		requirements of information security					
3.	**ОРК- 10**	The ability to solve standard tasks of professional activity using information, bibliographic resources, medical and biological terminology, information and communication technologies, taking into account the basic requirements of information security	Software for the implementation of information processes in medicine. Basic technologies of discrete orthogonal and wavelet transformations of information..	ID-1 OPK-10 Uses modern information and communication tools and technologies in professional activities.	theoretical foundations of computer science, collection, storage, search, processing, transformation, use of information computer systems in medicine and healthcare; mathematical methods for solving intellectual problems and their application in medicine;	use educational, scientific, popular science literature,,	skills of working with the MATLAB package
4.	**ОРК- 10**	The ability to solve standard tasks of professional activity using information, bibliographic resources, medical and biological terminology, information and communication technologies, taking into account the basic requirements of	Object recognition when decoding medical images	ID-1 OPK-10 Uses modern information and communication tools and technologies in professional activities.	Block diagrams of digital filters. Isolation of noise in signals. Recovery of lost data. Approximation of derivatives. Examples of wavelets. Discrete wavelet transform. Visualization. Fast	use educational, scientific, popular science literature,	skills of working with the MATLAB package

		information security			algorithms and implementation in Matlab language.		

3. Place of discipline in the structure of the educational program

The discipline "Information technology in medicine" is optional

4. The volume of the discipline and types of educational work

Type of educational work		Total hours / credits units	Semester VII
Classroom lessons (total)		20	20
Including:			
Lectures (L)			
Practical lessons (PL)		20	20
Seminars (S)			
Laboratory work (LW)			
Student independent work (IWN), including		16	16
Medical history (MH)			
Coursework (CW)			
Abstract (Ref)			
Settlement and graphic works (SGW)			
Preparation for classes (PC)			
Preparation for routine control (PRC)			
Preparation for intermediate control (PIC)			
Other types of independent work		16	16
Type of intermediate certification offset (O)	offset (O)		(O)
Type of intermediate certification offset (E)	exam (E)		
TOTAL: Total labor intensity (units)	hour	36	36
	ZET	1,0	1,0

5. Content of the discipline

п/п №	No. of Semestr	Name of the section of the educational disciplines	Types of educational activities including independent work students (in hours)					Forms of monitoring progress (by week of the semester)
			L	LL	PW	IWS	Total	
1	2	3	4	5	6	7	8	9
1.	7	Biomedical Signal Analysis - Digital Signals and Images			5	4	9	OS
2.	7	Digital images in MATLAB and their application in medical research			5	4	9	OS , WS
3.	7	Software for the implementation of information processes in medicine. Basic technologies of discrete orthogonal and wavelet transformations of information.			5	4	9	OS , WS
4.	7	Object recognition when decoding medical images			5	4	9	OS , WS
		TOTAL:			**20**	**16**	**36**	

Note: OS - oral survey, WS- written survey

6. List of educational and methodological support for independent work of students in discipline

№/п	No. of Semestr	Name of the teaching methodical development
1.	7	Kazaryan M.L. "Digital processing of medical images in MATLAB"

7. The Fund of Evaluation Means for the Intermediate Certification of Students in Discipline

№/п	List of competences	№ semester	Indicator assessments	Evaluation Criteria	Scale of assessment	Name FES
1	2	3	4	5	6	7
1	OPK-10	7	See standard for quality assessment of education ,	See standard for quality assessment of education ,	See standard for quality assessment of education ,	Tickets to offset; Test tasks

| | | | approved by order FSBEE HE NOSMA Ministry of Health of RF 10.07.2018у., №264/о | approved by order FSBEE HE NOSMA Ministry of Health of RF 10.07.2018у., №264/о | approved by order FSBEE HE NOSMA Ministry of Health of RF 10.07.2018у., №264/о | |

8. **The list of basic and additional educational literature necessary for mastering the discipline**

№ п/п	Наименование	Автор (ы)	Год, место издания	Кол-во экземпляров		Наименование ЭБС/ссылка ЭБС
				в библиотеке	на кафедре	
1	2	3	4	5	6	7
Основная литература						
1.	Медицинская информатика	Чернов В.И. и др.	Ростов н/Д, Феникс, 2007.	100	5	
2.	Информационные системы в здравоохранении	Сабанов В.И., Голубев А.Н., Комина Е.Р.	Ростов н/Д, Феникс, 2007.	71	5	
3.	Основы практической информатики в медицине	Чернов В.И., Есауленко В.И., Семенов С.Н.	Ростов н/Д, Феникс, 2007.	101	5	
4.	Медицинская статистика	Жижин К.С.	Ростов н/Д, Феникс, 2007.	100	5	
5,	Медицинская информатика Учебник	В.П.Омельченко., А.А.Демидова	М:ГЭОТАР-Медиа, 2016			«Консультант студента» http://www.studmedlib.ru/ru/book/ISBN9785970436455.html
Дополнительная литература						
1.	Информатика. Практический курс для студентов медицинских вузов	Арунянц Г.Г., Столбовский Д.Н., Калинкин А.Ю.	Владикавказ, Олимп, 2005.	196	5	
2.	Цифровая обработка в среде MATLAB	Гонсалес Р., Вудс Р, Эддинс С,	М.: Техносфера, 2006		1	

3.	Информационн ые системы и технологии в медицине и здравоохранени и	под ред. Арунянца Г.Г.	Владикавказ, Олимп, 2001.	222	5	
4.	Основы работы в сети INTERNET	Арунянц Г.Г., Столбовский Д.Н., Калинкин А.Ю.	Владикавказ, Олимп, 2001.	207	5	
5.	Медицинская статистика	Герасимов А.Н	М..МИА 2007	7	5	
6.	Медицинская информатика Учебник	Ред Т.В. Зарубиной Б.А. Кобринского	М:ГЭОТАР Медиа, 2016			«Консультант студента» http://www.s tudmedlib.r u/ru/book/IS BN9785970 436899.html

СОГЛАСОВАНО
Зав. библиотекой

9. The list of resources of the information and telecommunication network "Internet", necessary for mastering the discipline

1. "Student consultant"
2. www.spsl.nsc.ru/win/navigatrn.html "Navigator on Information and Library Resources of the Internet" on the site of the GPTNB of the Siberian Branch of the Russian Academy of Sciences. It is a common resource that integrates links to other libraries.
3. it2med.ru/mir.html "WORLD - Medical Internet Resources" on the website of "MedInformConsulting" (Moscow). It is a specialized resource that integrates links to medical libraries and other medical resources.
4. www.scsml.rssi.ru/ Central Scientific Medical Library (TsNMB) IM Sechenov), the database "Russian medicine" - contains information on the primary sources, received in the CNMB after 1988 in the sections
   • Articles - include articles from domestic journals and collections;
   • dissertations - include domestic abstracts and dissertations;
   • books - include domestic, translated and foreign books. This database contains only bibliographic descriptions of the primary sources available in the CNMB, and practically does not contain abstracts and texts of the documents themselves. Subscribers can order paper and electronic copies of articles and abstracts. ЦНМб does not make full copies of books and dissertations, and also electronic text copies of primary sources.
5. www.webmedinfo.ru/index.php WEBmedINFO.RU - books (for many medical specialties), software, reference books, atlases, tests, abstracts, medical history (www.webmedinfo.ru/referat/), articles, drug search in pharmacies of different cities
6. medlib.ws/ Medlib.ws — a new project (opened August 1, 2008), offering books and articles on many medical specialties, traditional medicine and a healthy lifestyle. In addition, the site hosts electronic reference books, tests and video materials
7. ucm.sibtechcenter.ru/ The Consolidated Catalog of Periodicals and Analytics on Medicine "- has been implemented since March 2003 and unites 12 medical libraries of Russia of various departmental affiliations. The main goal of the project is the creation of a consolidated catalog

of periodicals and analytical lists on medicine. As a linguistic resource, the MeSH thesaurus and the "Russian Medicines" database act.

8. www.kuban.su/medicine/shtm/00.htm 13 The medical library on the site kuban.su offers articles, books on various medical specialties (cardiology, gastroenterology, neurology, nephrology, ophthalmology, gerontology, pulmonology, endocrinology, reproduction, osteoarthritis, emergency care), materials on the use of medications, links to medical sites and several normative documents

9. www.neuro.net.ru/bibliot/ The library NEVRONET offers literature for specialists and patients in the field of neurology, psychiatry and related specialties. Contains a compilation of materials on epilepsy, dictionaries, reference books and encyclopedias (EEG terminology dictionary, semiotics of children's diseases, Harrison's directory on internal diseases, Big Medical Encyclopedia, Big Encyclopedia of Massage, Oxford Medical Dictionary).

10 lib.ru/NTL/MED/ Section "Medicine" of the project "LIB.RU - Maxim Moshkov's Library", contains reference materials and manuals on some medical issues (physical therapy, homeopathy, vision improvement, overweight, alternative medicine, surgery, theory of aging)

11 www.medtext.ru/pafiledb/index.php The project "MedTEXT" - contains in the archived form educational materials on many medical specialties, articles, medical history, abstracts, software (including MS-DOS).

12 www.medliter.ru/?page=buy A paid resource "Medical literature". Payment can be made by sending an SMS message or through any electronic payment system.

14. it-medical.ru/index.php?option=com_mtree&Itemid=33 The electronic medical library IT Medical, allowing to view materials on some medical specialties (anatomy, anesthesiology, medical law, patanatomy, resuscitation, therapy, pharmacy, surgery).

15. www.infarktu.net/ The InfarctuNet project provides specialists with texts on IHD (myocardial infarction, acute coronary syndrome, stable and unstable angina pectoris), thrombolytic therapy, atherosclerosis, arterial hypertension, heart failure and arrhythmia

16. www.rusanesth.com/ Russian anesthesia server is a specialized resource offering articles on: regional anesthesia and pain management, general anesthesia problems, new intensive care, anesthesia drugs, practical aspects of anesthesiology, obstetric anesthesiology.

17. www.galark.ru/arhiv/index.html The site library "Anesthesiology and Implantology in Dentistry" contains a selection of articles for patients and doctors. This section also contains some programs for doctors 14

18. reanclub.info/publ/ Project "Reanimation Club", is intended for professional and social communication of specialists related to intensive care, reanimatology, anesthesiology. Contains a specialized collection of articles and books, medical software

10. Methodical instructions for students to learn the discipline

Training consists of classroom activities (20hours) and independent work (16hours). In the discipline, the following educational technologies are used. Lecture course: lectures accompanied by video materials (slide presentations, demo versions of information medical systems). Practical exercises: designed for individual work of students with a computer, provide for the solution of situational problems using standard software applications and fragments of special software tools - operating medical information systems (computer simulations of the medical-diagnostic process). The proportion of sessions conducted in interactive forms is at least 46% of classroom activities. Independent work with literature and the writing of abstracts form the ability to analyze medical and social problems, the ability to use natural-scientific, medical-biological and clinical information in practice in various types of professional and social activities. Each student is provided with access to the library funds of the academy and the department. For each section of the academic discipline, methodical recommendations for students and guidelines for teachers. Students'

learning activities, including independent work with literature and specialized software products, contribute to the mastery of the culture of thinking, the ability in written and oral speech to logically correctly formalize its results; the formation of a systematic approach to the analysis of medical information, the perception of innovation.

11. List of information technologies used in the implementation of the educational process in discipline

MATLAB, Microsoft Office, Test Pro.

12. Description of the material and technical base necessary for the implementation of the educational process in discipline

Lecture auditoriums with a projector and two equipped computer classrooms for students to carry out the research and development work provided for in the workshop and equipped with a local network and access to the Internet; means for implementing multimedia demonstrations (multimedia projector, laptop, screen, projector, speakers) Lecture auditoriums with a projector and two equipped computer classrooms for students to carry out the research and development work provided for in the workshop and equipped with a local network and access to the Internet; means for implementing multimedia demonstrations (multimedia projector, laptop, screen, projector, speakers).

№/п	Name of the equipment	Quantity	Technical condition
1	2	3	4
Special equipment			
1.	multimedia complex (laptop, projector, screen)	1	satisfactory

13. Conducting educational activities using e-learning and distance learning technologies.

In the context of the introduction of restrictive measures (quarantine) associated with an unfavorable epidemiological situation, the threat of the spread of a new coronavirus infection and other force majeure events that do not allow full-time training, it is possible to study this discipline or part of it using e-learning and distance educational technologies. Teaching the discipline in the above situations will be carried out through the development of an electronic course with access to video lectures and interactive course materials: presentations, articles, additional materials, tests and various tasks. When conducting training sessions, monitoring progress, as well as intermediate certification of students, platforms of the electronic information and educational environment of the academy and / or other elearning systems recommended for use in the academy, such as Moodle, Zoom, Webinar, etc., can be used. Lectures can be presented in the form of audio, video, "live lectures", etc. Conducting seminars and practical classes is possible on-line in both synchronous and asynchronous modes. Seminars can be conducted in the form of web conferences.