FEDERAL STATE BUDGETARY
EDUCATIONAL INSTITUTION OF HIGHER EDUCATION
«AMUR STATE MEDICAL ACADEMY»
MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION

AGREED
Vice-Rector for Academic Affairs,

_____ N.V. Loskutova

April 17, 2025

Decision of the CCMC
April 17, 2025

Protocol No. 7

APPROVED
by decision of the Academic Council of the FSBEI HE Amur SMA of the Ministry of Health of the Russian Federation
April 22, 2025

Protocol No. 15

Acting Rector of the FSBEI HE Amur SMA of the Ministry of Health of the Russian Federation

_____ I.V. Zhukovets

April 22, 2025

ДОКУМЕНТ ПОДПИСАН
ЭЛЕКТРОННОЙ ПОДПИСЬЮ

Сертификат: 50AB2242604E64520B52614FA420034A
Владелец: Жуковец Ирина Валентиновна
Действителен: с 15.04.2025 до 09.07.2026

EDUCATIONAL PROGRAM

discipline «Medical informatics»

Specialty: 31.05.01 General Medicine
Course: 2, 5
Semester: 4, 10
Total hours: 144 hrs.
Total credits: 4 credit units
Control form: – credit-test, 4semester
– credit, 10semester

Blagoveshchensk, 2025

The educational program of the discipline is designed in accordance with the requirements of the Federal State Educational Standard of Higher Education - specialist in specialty 31.05.01 General Medicine, approved by the order of the Ministry of Education and Science of Russia dated 08.12.2020 No. 988 (registered with the Ministry of Justice of Russia on 08.26.2020 No. 59493), BPEP HE (2021).

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Head of the Department of Physiology and Pathophysiology of the Federal State Budgetary Educational Institution of Higher Education Amur State Medical Academy, Holder of an Advanced Doctorate (Doctor of Science) in Biological Sciences, Ph.D. of Chemical Sciences, Associate Professor, T.A. Batalova

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APPROVED at the meeting of the Department of Medical Physics, Protocol No. 12 dated April 15, 2025

Head of Department, Ph.D. of Pedagogic Sciences, Associate Professor _____ **E.V. Plashchevaya**

Conclusion of the Expert Commission on the review of the Educational Programs: Protocol No. 2 dated April 16, 2025

Expert of the expert commission, Ph.D. of Engineering Sciences _____ **E.A. Utochkina**

APPROVED at the meeting of the Cycle Methodical Committee No. 1: Protocol No. 7 dated April16, 2025.

Chairman of the CMC No. 1 Holder of the Advanced Doctorate (Doctor of Sciences) in Medical Sciences, Professor _____ **E.A. Borodin**

AGREED: Dean of the Faculty of Medicine, Ph.D. of Medical Sciences _____ **N.G. Brush**

April 17, 2025

CONTENT

1. EXPLANATORY NOTE

1.1. Characteristics of the discipline

A new paradigm for protecting the personal and public health of citizens, implemented on the basis of the comprehensive use of information and communication technologies, is e-health.

Electronic health care implies a systematic approach to solving the entire spectrum of public health problems, implemented on the basis of comprehensive electronic document management, which necessarily includes personal medical data, providing prompt access to all information, the possibility of its joint remote analysis by doctors and contacts between doctors and patients based on telemedicine technologies.

The development of electronic and digital healthcare dictates the need to deepen and expand knowledgetaught discipline «Medical Informatics».

The features of studying the discipline «Medical Informatics» are: the interdependence between the goals of information and medical education; the universality and fundamental nature of the course; the peculiarity of constructing their content depending on the nature and general goals of training a doctor and his specialization.

1.2Goal and objectives of the discipline.

The purpose of teaching the discipline:

- familiarization with basic information on computer science and medical informatics;
- formation of ideas about modern software and hardware for processing medical information;
- formation of knowledge about computerization of management in the healthcare system;
- formation of ideas about the processes and methods of processing medical information, ways of practical use of information flows in the professional activities of a doctor;
- formation of knowledge about medical Internet resources, forms and possibilities of telemedicine services.

Learning objectives of the discipline:

- study of modern computer technologies in application to solving problems in medicine and healthcare;
- study of methodological approaches to the formalization and structuring of various types of medical data used to form decisions during the treatment and diagnostic process;
- formation of ideas about methods of informatization of medical activities, automation of clinical research, informatization of management in the healthcare system;
- students' mastery of modern information technology tools, including applied and special computer programs for solving problems in medicine and healthcare, taking into account the latest information and telecommunication technologies;
- study of means of information support for medical decision-making;
- students acquire practical skills in using medical information systems for the purposes of diagnosis, prevention, treatment and rehabilitation.

1.3. The place of the discipline in the structure of the main professional educational program of higher education.

In accordance with the Federal State Educational Standard of Higher Education - a specialist in the specialty 31.05.01 General Medicine (2020), the discipline «Medical Informatics» refers to the disciplines of the basic part, Block 1. The total workload is 4 credit units (144 hours), taught in the 4th and 10th semesters in the 2nd and 5th years. The form of control is a credit in the 4th semester and a credit with a grade in the 10th semester.

Students are trained on the basis of continuity of knowledge and skills acquired in the school course of informatics of general educational institutions. To master the discipline «Medical informatics» theoretical knowledge and skills in informatics, practical skills of computer literacy in the volume provided by the secondary school program are required.

The discipline «Medical Informatics» is a subject necessary for studying specialized disciplines that are taught in parallel with this subject or in subsequent courses. Mastering the discipline "Medical Informatics" precedes the study of: normal physiology, pathophysiology, clinical pathophysiology; biochemistry; histology, embryology, cytology; hygiene; microbiology and virology; public health and healthcare; neurology; otolaryngology; ophthalmology, radiation diagnostics and radiation therapy; infectious diseases and other clinical disciplines.

The discipline «Medical Informatics» consists of 2 sections, which present the most important and necessary information that determines the educational process:
Section 1: Basic technologies for presentation and processing of medical information.
Section 2: Medical information systems. Electronic health.

1.4 Requirements for students

To study the discipline «Medical Informatics», a student must have the necessary knowledge, skills and abilities developed in institutions of secondary (complete) general education:

Informatics
Knowledge: theoretical foundations: computer science and principles of building computer architecture; working with a text and graphic editor; preparing presentations and working with the Internet.
Abilities:use computer equipment; perform basic statistical processing; use the Internet; use educational and popular science literature.
Skills: master basic information transformation technologies; work with text and spreadsheet editors, search the Internet.
Mathematics
Knowledge: Fundamentals of mathematical statistics and probability theory.
Abilities:use mathematical apparatus for statistical calculations.
Skills: applies simple mathematical apparatus to work with medical and biological data.

1. 5 Interdisciplinary links with subsequent disciplines

Knowledge, skills and abilities necessary for studying subsequent disciplines:

No. p/p	Name of subsequent disciplines	Section numbers of the discipline required for studying subsequent disciplines	
		1	2
1	Biochemistry	+	+
2	Normal Physiology	+	+
3	Pathophysiology, clinical pathophysiology	+	+
4	Pharmacology	+	+
5	Hygiene	+	+
6	Propaedeutics of internal diseases	+	+
7	Histology, embryology, cytology	+	+
8	Hospital therapy	+	+
9	Faculty surgery, urology	+	+
10	Otorhinolaryngology	+	+
11	Ophthalmology	+	+
12	Microbiology, virology	+	+
13	Neurology	+	+
14	Public Health and Healthcare	+	+
15	Infectious diseases	+	+
16	Radiation diagnostics	+	+
17	Anesthesiology, resuscitation, intensive care	+	+

1. 6 Requirements for the results of mastering the discipline

The study of the discipline «Medical Informatics» is aimed at the formation of the following competencies: universal (UC-1, 4, 6) and general professional (GPC-10, 11).

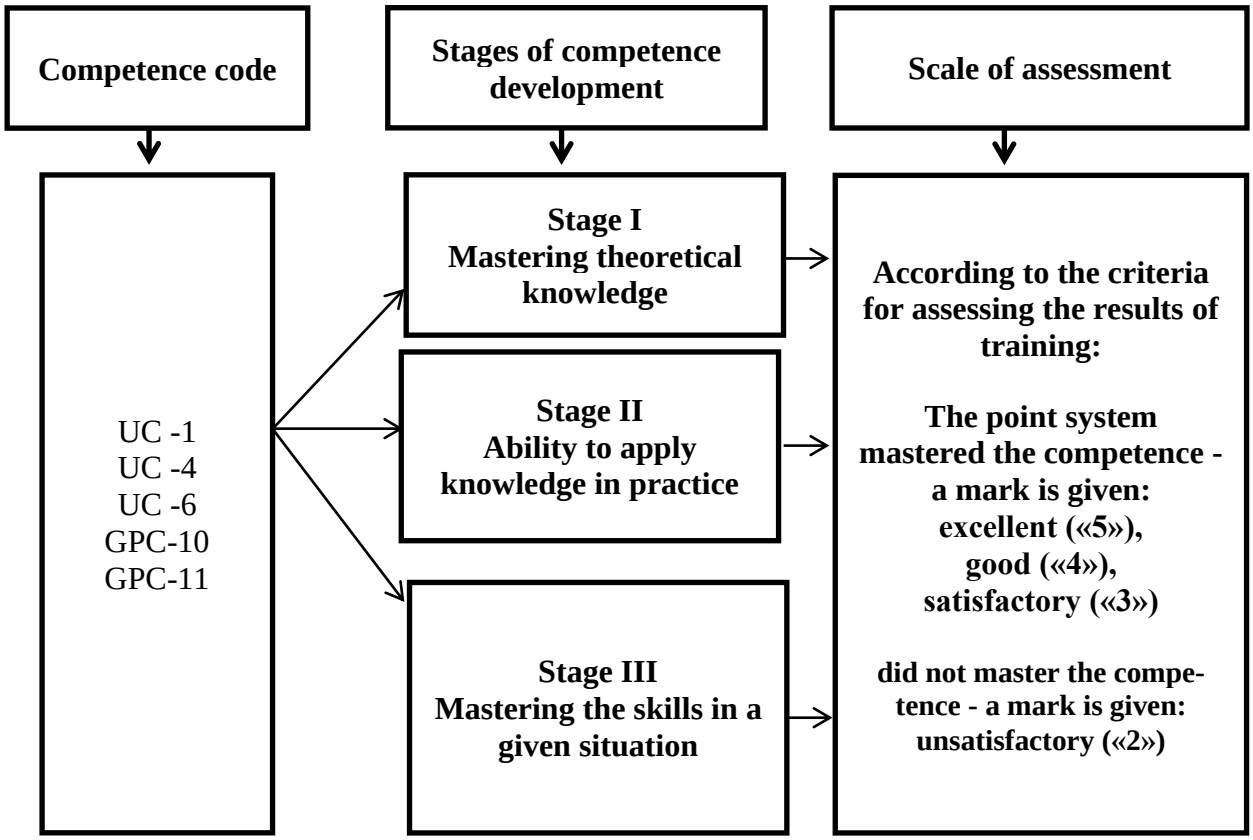
No. p/p	Code and name of competence	Codeand the name of the indicator of achievement of competence
Universal Competencies		
1	**UC-1.** Capable of carrying out a critical analysis of problematic situations based on a systems approach, developing an action strategy	**AIUC-1.1.** Analyzes the problem situation as a system, identifying its components and the connections between them. **AIUC-1.2.**Identifies gaps in information needed to solve problem situations and designs processes to eliminate them. **AIUC-1.3.** Applies systems analysis to resolve problematic situations in the professional sphere.
	UC-4. Able to apply modern communication technologies, including in foreign language(s), for academic and professional interaction	**AIUC-4.2.**Uses modern communication resources to search, process and transmit information necessary for the high-quality performance of professional tasks and the achievement of professionally significant goals.
	UC-6. Able to define and implement priorities of own activity and ways of its improvement based on self-assessment and education throughout life	**AIUC-6.1.** Assesses his/her personal, situational, and time resources and uses them optimally to complete the assigned task. **AIUC-6.3.** Conducts critical self-analysis of the results of one's own activities.
General Professional Competencies		
2	**GPC-10.** Able to understand the principles of operation of modern information technologies and use them to solve professional activities.	**AI GPC-10.2.** Carries out effective search for information necessary for solving problems of professional activity, using legal reference systems and professional pharmaceutical databases. **AIGPC-10.3.** Uses specialized software for mathematical processing of observational and experimental data when solving problems in professional activities.
	GPC-11. Capable of preparing and applying scientific, scientific-production, design, organizational-managerial and regulatory documentation in the healthcare system	**AIGPC 11.1.** Applies modern methods of collecting and processing information, conducts statistical analysis of the obtained data in the professional field and interprets the results to solve professional problems. **AIGPC-11.2.** Identifies and analyzes problem situations, searches for and selects scientific, regulatory and organizational documentation in accordance

		with the specified goals. **AIGPC-11.4.** Conducts scientific and practical research, analyzes information using the historical method and prepares publications based on the research results.

Sections of the discipline and the code of the competence being formed

Item No.	Section name	Code of the competence being formed
1	Basic technologies for presentation and processing of medical information.	UC-1, UC-4, UC-6, GPC-10, GPC-11
2	Medical information systems (MIS). Electronic health.	UC-1, UC-4, UC-6, GPC-10, GPC-11

1.7 Stages of competencies development and description of assessment scales



1.8 Forms of training organization and types of control

Form of organization student training	Briefcharacteristic
Lectures	Lecturematerialcontainskeyandmostproblematicquestionsdisciplines,mostsignificantpreparationspecialist.
Practical classes	IntendedForanalysis (consolidation) of theoreticalprovisionsandcontrolovertheirassimilationwithsubsequentapplicationreceivedknowledgeVin the coursestudy of the topic.
Interactive forms of education	- solutionsituationaltasks and exercises followed bydiscussion, - interactive survey; - executioncreativetasks, - small group method,

	- discussions, - online course of the discipline in the Moodle system, - testing in the Moodle system.
Participation in the department's research work, student circle and conferences	- Preparationoralmessages and poster presentations forspeechesat a student club or scientific conference; - writing theses and abstracts on the chosen scientific field; - preparation of a literature review using educational, scientific, reference literature andInternet sources.
Types of control	**Brief description**
Incoming inspection	Testing theoretical knowledge and practical skills developed by the computer science program in secondary (complete) general education institutions. The entrance knowledge control includes: - testing in the Moodle system (test of incoming knowledge control), - solving situational problems and exercises. The results of the incoming inspection are systematized, analyzed and used by the teaching staff of the department to develop measures to improve and update the teaching methods of the discipline.
Current control	Current knowledge control includes: - checking the solution of situational problems and exercises completed independently (extracurricular independent work); - assessment of the assimilation of theoretical material (oral survey and computer testing); - control over the technique of performing the experiment during practical classes and drawing up the protocol; - testing in the Moodle system on all topics of the discipline (tests include questions of a theoretical and practical nature); - individual assignments (practical and theoretical) for each topic of the discipline being studied.
Interim assessment	The midterm assessment is represented by a credit at the end of the 4th semester, and a credit with a grade at the end of the 10th semester. The test includes the following stages: - assessment of knowledge of theoretical material (oral survey and interview); - testing in the Moodle system (interim assessment test); - check of assimilationpracticalskillsandskills; - solving situational problems and exercises on each topic of the discipline studied.

2. STRUCTURE AND CONTENT OF THE DISCIPLINE

2.1 Scope of the discipline and types of educational activities

No. p/p	Types of educational work	Total hours	Semester	
			4	**10**
1	Lectures	28	20	8
2	Practical classes	68	52	16
3	Independent work of students	48	36	12
	Total workload intensity in hours	**144**	108	36
	Total workload in credit units	**4**	3	1

2.2 Thematic plan of lectures and their brief content

Item No.	Topics and content of lectures	Codes of formed competencies	Labor intensity (hours)
	4th semester		
1	**Introduction to Medical Informatics.** Medical information systems. The concept of medical informatics. Subject, object and purpose of medical informatics. Types of medical information. Methods of obtaining reliable medical information. The degree of availability of medical information. Classification of information by the degree of relevance. Measures of medical information.	UC-1 UC-4 UC-6 GPC-10	2
2	**Introduction to evidence-based medicine.** The concept of evidence-based medicine. Reasons for the emergence of evidence-based medicine. The process of evidence-based medicine. Descriptive and analytical statistics as tools of evidence-based medicine.	UC -1 UC -4 UC -6 GPC -10	2
3	**Time series analysis.** Time series: definition, methods of presentation, scope of application. Classification of time series. Primary analysis of time series. Study of the structure of time series.	UC -1 UC -4 UC -6 GPC -10	2
4	**Information technology in medicine.** The concept of information technology. Types of information technology. Technology of processing medical information.	UC -1 UC -4 UC -6 GPC -10	2
5	**Automated workplace for a medical worker.** The concept and components of the automated workplace. The purpose of the automated workplace. The main principles and requirements for creating the automated workplace. The structure of the automated workplace. The automated workplace of a doctor. The automated workplace of a mid-level medical worker. The automated workplace of auxiliary and administrative and economic units.	UC -1 UC -4 UC -6 GPC -10	2
6	**Medical information systems.** The concept of a medical information system. Functions and properties of a medical information system. The main tasks of a medical information system. Classification of medical information systems by levels. The main requirements for the construction and composition of a medical information system. The main types of medical information systems	UC -1 UC -4 UC -6 GPC -10	2

	and their purpose. Medical information systems for medical and preventive institutions. Types of medical information systems. Medical information system "MEDIALOG". The advantages and capabilities of this system. The modular structure of the "Medialog" system. Module - "Electronic medical record". Module - "Schedule". Working in the Medialog system "Therapist profile".		
7	**Medical application of computer networks. Medical resources of the Internet.** Purpose of computer networks. Classification of computer networks. Topology of local area networks. Physical transmission media in local area networks (LAN). Network cables and wireless channels. Local area network equipment. Special medical computer networks. Wi-Fi in medicine. General information about the global Internet. The most popular Internet services.Browsing and navigation programs (browsers). The most popular browsers. Principles of searching for information on the Internet. Medical Internet resources. Classification of medical resources and Internet services. Telemedicine. Directions in the use of telecommunication technologies. History of telemedicine. Standardization of information in telemedicine. Telemedicine centers.	UC -1 UC -4 UC -6 GPC -10	2
8	**Telemedicine. Telemedicine technologies.** Basic concepts of telemedicine. Regulatory documents. Prospects for the development of telemedicine in Russia. Telemedicine capabilities. Main directions of telemedicine.	UC -1 UC -4 UC -6 GPC -10	2
9	**Artificial intelligence in medicine. Neural networks.** The concept of artificial intelligence. Objectives and principles of creating artificial intelligence. Artificial intelligence technologies. Types of artificial intelligence. Problems in medicine solved by artificial intelligence. Areas of application of artificial intelligence in medicine. The main advantages and disadvantages of artificial intelligence.	UC -1 UC -4 UC -6 GPC -10	2
10	**Multimedia technologies. Technology for creating and conducting computer presentations.** Basic concepts. Advantages of multimedia presentations. Methods of presenting and transmitting information. Effective form of creating a presentation. Principles of creating a presentation. Presentation structure. Stages of creating a presentation. Basic requirements for creating slides. Program for creating a presentation.	UC -1 UC -4 UC -6 GPC -10	2
	Total hours for 4th semester:		**20**
	10th semester		

	Automated workplace of a doctor. The concept of an automated workplace. The composition of the automated workplace. Tasks and functions of a doctor's automated workplace. Effective means of computerizing a doctor's automated workplace.	UC -1 UC -4 UC -6 GPC -10	
	Medical information systems (MIS). Electronic health. The concept of a medical information system (MIS). Functions and properties of a MIS. The main tasks of a MIS. Classification of medical information systems by levels. The main requirements for the construction and composition of a MIS. The main types of MIS and their purpose. The concept of electronic health care. The goals and objectives of electronic health care.Directions of electronic health.Stages of development of the concept of electronic health care. Results of the implementation of electronic health care.	UC -1 UC -4 UC -6 GPC -10	
	Types of MIS. Module "Electronic medical record". The concept of the medical information system MIS. MIS "Medialog". Advantages and capabilities of this system. Modular structure of the "Medialog" system. Module - "Electronic medical record". Module - "Schedule". Work in the Medialog system "Therapist profile".	UC -1 UC -4 UC -6 GPC -10	
	Telecommunication technologies in medicine. The concept of telemedicine and telemedicine technologies. The main areas of application of telemedicine technologies. The main functions and areas of application of telemedicine systems.Distance education in medicine.Home telemedicine. Clinical application of telemedicine technologies.	UC -1 UC -4 UC -6 GPC -10	
	Total hours for 10th semester:		**8**
	Total hours:		**28**

2.3 Thematic plan of practical classes and their content.

No. p/p	Name of practical topics classes	Contents of practical classes	Codes being formed competencies and indicators their achievements	Types control	Labor intensity (hours)
4th semester					
1	Introduction to medical informatics. Concept of informatization of Healthcare of Russia and Amur Region.	Entrance control (checking theoretical knowledge and practical skills developed by the computer science program in secondary (complete) general education institutions. **Theoretical part:** Basic concepts of medical informatics. Concept of medical information. Concept of medical informatics. Types of medical information. Nature of medical information. Features of medical information. Objectivity of medical information. Reliability of medical information. Availability of medical information. Relevance of medical information. Measures of medical information. **Practical part:** Solving test tasks.	UC-1: AI 1.1., 1.2., 1.3. UC-4: AI 4.2. UC-6: AI 6.1., 6.3. GPC-10: AI 10.2., 10.3 GPC-11: AI 11.1., 11.2., 11.4.	Solving situational problems, frontal survey, testing in the Moodle system.	3.25
2	Use of information technology in medicine and healthcare.	**Theoretical part:** The concept of information technology. Types of information technology. Technology of processing medical information. **Practical part:** Description of information technologies used in medicine.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, testing in the Moodle system.	3.25
3	Fundamentals of evidence-based medicine.	**Theoretical part:** Descriptive and analytical statistics as tools of evidence-based medicine. Nonparametric statistical	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3.	Frontal survey, solving situational problems,	3.25

		methods (Mann-Whitney test and Wilcoxon test). **Practical part:** Solving problems using nonparametric statistical methods (Mann-Whitney test and Wilcoxon test).	GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	working on a practical assignment, testing in the Moodle system.	
4	Preparing documents using a text editor: creating, editing, formatting text to solve medical problems. Technology of working with drawings, creating formulas.	**Theoretical part:** Text editor. The main elements of the Microsoft Office Word interface: title bar; menu bar; toolbar; rulers; scroll bars; status bar. **Practical part:** Create and edit a medical document using a given template.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, work on a practical assignment, testing in the Moodle system.	3.25
5	Preparing documents using a text editor: embedding objects. Techniques for working with tables, creating diagrams.	**Theoretical part:** Text editor. The main elements of the Microsoft Office Word interface: title bar; menu bar; toolbar; rulers; scroll bars; status bar. **Practical part:** Create and edit a table and diagram in a medical document using a given template.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, work on a practical assignment, testing in the Moodle system.	3.25
6	Creating presentations in MS environmentPowerPoint. Interface, main elements and capabilities for solving medical problems.	**Theoretical part:** Main elements of the program interfacePowerPoint. **Practical part:** Create and edit a presentation on a medical topic using a given template.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, work on a practical assignment, testing in the Moodle system.	3.25
7	Medical resources of the Internet. Telemedicine.	**Theoretical part:** Browsers. Popular browsers. Principles of searching for information on the Internet. Prospects for the development of domestic telemedicine. Quality criteria for assessing a website. **Practical part:**	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, test-	3.25

		Getting to know the Mozilla Firefox browser. Assess the quality of the Amur State Medical Academy website. Searching for medical information on the Internet.		ing in the Moodle system.	
8	Computer networks in medicine.	**Theoretical part:** Purpose of computer networks. Bandwidth of information channel. Classification of computer networks. Topology of local area networks. Physical transmission media in local area networks (LAN). Network cables and wireless channels. **Practical part:** Definition of classification of computer networks. Special medical computer networks. Use of Wi-Fi in medicine.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, testing in the Moodle system.	3.25
9	Medical information systems.	**Theoretical part:** The concept of a medical information system (MIS). Functions and properties of a MIS. The main tasks of a MIS. Classification of medical information systems by levels. The main requirements for the construction and composition of a MIS. The main types of MIS and their purpose. The concept of electronic health care. The goals and objectives of electronic health care.Directions of electronic health.Stages of development of the concept of electronic health care. Results of the implementation of electronic health care. **Practical part:** Work with MIS (clinic and hospital).	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Interview (assessment of knowledge of theoretical material), testing in the Moodle system.	3.25
10	Network tools Internet for searching professional information on individual sections of medical knowledge. Library information systems.	**Theoretical part:** Medical information retrieval. Automated library information systems.Reference and bibliographic apparatus. Electronic search systems in the library. Reference and bibliographic fund. Principle of construction. Functions of the ABIS software. **Practical part:** Working with library information systems.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, testing in the Moodle system.	3.25

11	Storing and processing information using spreadsheets: creating, editing, formatting tables.	**Theoretical part:** Spreadsheet. Basic elements of the Microsoft Office program interfaceExcel. Data types. Workbook. Worksheet components. Active cell. Using a spreadsheet as a database. Mathematical modeling. **Practical part:** Create, edit and format a spreadsheet using a given template.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, work on a practical assignment, testing in the Moodle system.	3.25
12	Calculations in spreadsheets: formulas, functions, add-ins	**Theoretical part:** Spreadsheet. Basic elements of the Microsoft Office program interfaceExcel. Using a spreadsheet as a database. Mathematical modeling. Learning the simplest calculation techniques in an Excel spreadsheet. **Practical part:** Perform calculations in spreadsheets using functions. A set of formulas.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, work on a practical assignment, testing in the Moodle system.	3.25
13	Excel spreadsheets for statistical processing of medical and biological data.	**Theoretical part:** Spreadsheet. Basic elements of the Microsoft Office program interfaceExcel. Data Types. Using a Spreadsheet as a Database. Mathematical Modeling. Learning the Basics of Programming in an Excel Spreadsheet. **Practical part:** Perform statistical processing of medical data using a spreadsheet.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, work on a practical assignment, testing in the Moodle system.	3.25
14	Study of probabilistic diagnostics using computer technologies.	**Theoretical part:** The concept of probabilistic diagnostics. Diagnostic algorithm. The concept of symptom complex. Machine diagnostics. The main types of medical logic in machine diagnostics. Methodology for calculating the value for the diagnostic table. **Practical part:** Based on the symptom complex established in the patient and the data of the diagnostic table, determine the probabilities of each of the possible diseases. Solution	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, testing in the Moodle system.	3.25

		of an individual problem on probabilistic diagnostics using MSExcel.			
15	Standard application software for solving medical problems.	**Theoretical part:** The main elements of the interface of the program Microsoft Office Word in solving medical problems. The main elements of the interface of the program Microsoft OfficeExcelin solving medical problems.The main elements of the interface of the Microsoft Office Power Point program in solving medical problems. **Practical part:** Solving test tasks.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Interview (assessment of knowledge of theoretical material), testing in the Moodle system.	3.25
16	Credit lesson	The interim assessment includes: - assessment of knowledge of theoretical material; - testing in the Moodle system; - testing the acquisition of practical skills and abilities; - solving situational problems and exercises.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Interview, problem solving and exercises, testing in the Moodle system.	3.25
Total hours for 4th semester:					**52**
10th semester					
1	Database Fundamentals. Developing a Medical Database.	**Theoretical part:** Basics of working in Microsoft Access, the concept of a database, basic principles of work. Database management system in Microsoft Access. Creating, maintaining and processing a database. Table structure and data types. Methods of creation. Database objects. Data types. **Practical part:** Working with databases in Microsoft Access.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, testing in the Moodle system.	3.2
2	Developing a Relational Database in Microsoft Access	**Theoretical part:** Relational data model. Database management system in Microsoft Access. Creating, maintaining and processing a database. Table structure and data types. Methods of creation. Database objects. Data types.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, testing	3.2

		Practical part: Creating a database by profile: - filling the database; - entering and editing data in a table; - creating simple shapes; - creating queries; - filtering, searching and sorting data; - placement of new objects; - creating new tables; - creating reports; entering and viewing data using a form.		in the Moodle system.	
3	Automated workplace of a doctor.	**Theoretical part:** The concept of automated workplace. principles of creating automated workplace. Classification of automated workplace. Medical database. **Practical part:** - working with Harrison's Handbook of Internal Medicine; - work with the international classification of diseases ICD-10; - working with an electronic encyclopedia of medicines; - working with the practical physician's handbook.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, testing in the Moodle system.	3.2
4	Study of the probabilistic method of disease diagnosis.	**Theoretical part:** The concept of probabilistic diagnostics. Diagnostic algorithm. The concept of symptom complex. Machine diagnostics. The main types of medical logic in machine diagnostics. Methodology for calculating the value for the diagnostic table. **Practical part:** Based on the symptom complex established in the patient and the data of the diagnostic table, determine the	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Frontal survey, solving situational problems, working on a practical assignment, testing in the Moodle system.	3.2

		probabilities of each of the possible diseases. Solution of an individual problem on probabilistic diagnostics using MSExcel.			
5	Credit lesson	The interim assessment includes: - assessment of knowledge of theoretical material; - testing in the Moodle system; - testing the acquisition of practical skills and abilities; - solving situational problems and exercises.	UC -1: AI 1.1., 1.2., 1.3. UC -4: AI 4.2. UC -6: AI 6.1., 6.3. GPC -10: AI 10.2., 10.3 GPC -11: AI 11.1., 11.2., 11.4.	Interview, problem solving and exercises, testing in the Moodle system.	3.2
Total hours for 10th semester:					**16**
Total hours					**68**

2. 4 Interactive forms of training

interactive methods are widely used in practical classes.training (interactive survey, work in small groups, computer testing, etc.), participation in educational and research and scientific research work.

No. p/p	Topic of the practical class	Workload intensity in hours	Interactive form of education	Workload intensity in hours, in % of the practical class
4th semester				
1	Introduction to medical informatics. Concept of informatization of Healthcare of Russia and Amur Region.	3.25	Interactive survey Testing in Moodle	15 min (0.1 hour) / 10% 15 min (0.1 hour) / 10%
2	Use of information technology in medicine and healthcare.	3.25	Interactive survey Testing in Moodle	15 min (0.1 hour) / 10% 15 min (0.1 hour) / 10%
3	Fundamentals of evidence-based medicine.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) /10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
4	Preparing documents using a text editor: creating, editing, formatting text to solve medical problems. Technology of working with drawings, creating formulas.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
5	Preparing documents using a text editor: embedding objects. Techniques for working with tables, creating diagrams.	3.25	Interactive survey Testing in Moodle	15 min (0.1 hour) / 10% 15 min (0.1 hour) / 10%
6	Creating presentations in MS environmentPowerPoint. Interface, main elements and capabilities for solving medical problems.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
7	Medical resources of the Internet. Telemedicine.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 15 min (0.1 hour) / 10%
8	Computer networks in medicine.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
9	Medical information systems.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
10	Internet tools for searching professional	3.25	Interactive survey and discussion.	3.25 h / 100%

	information on individual sections of medical knowledge. Library information systems.			
11	Storing and processing information using spreadsheets: creating, editing, formatting tables.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
12	Calculations in spreadsheets: formulas, functions, add-ins	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
13	Excel spreadsheets for statistical processing of medical and biological data.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
14	Study of probabilistic diagnostics using computer technologies.	3.25	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
15	Standard application software for solving medical problems.	3.25	Interactive survey and discussion.	3.25 h / 100%
16	Credit lesson	3.25	Testing in Moodle system	90 min (61.5%)
	10th semester			
1	Database Fundamentals. Developing a Medical Database.	3.2	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
2	Developing a Relational Database in Microsoft Access	3.2	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
3	Automated workplace of a doctor.	3.2	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
4	Study of the probabilistic method of disease diagnosis.	3.2	Interactive survey Work in groups Testing in Moodle	15 min (0.1 hour) / 10% 40 min (0.25 hour) / 27.4% 15 min (0.1 hour) / 10%
5	Credit	3.2	Testing in Moodle system	90 min (61.5%)

2.5 Criteria for assessing students' knowledge

The assessment of acquired knowledge is carried out in accordance with the Regulations on the system for assessing the educational results of students of the Federal State Budgetary Educational Institution of Higher Education Amur State Medical Academy of the Ministry of Health of the Russian Federation.

The basis for determining the level of knowledge, skills, and abilities are the assessment criteria - completeness and correctness:

- correct, precise answer;
- correct but incomplete or imprecise answer

- incorrect answer; no answer.

When assigning marks, the classification of errors and their quality are taken into account:

- gross errors;
- similar errors;
- minor errors; shortcomings.

The success of students in mastering the topics of the discipline «Medical Informatics» is determined by the quality of mastering knowledge, skills and practical abilities, the assessment is given on a five-point scale: «5» - excellent, «4» - good, «3» - satisfactory, «2» - unsatisfactory.

Evaluation criteria

Quality of development	Mark on a 5-point scale
90 - 100%	«5»
80 - 89%	«4»
70 - 79%	«3»
less than 70%	«2»

Entrance control

Conducted during the first lesson, includes: solving problems and exercises; testing in the Moodle system.

Access mode for 4th semester: https://educ-amursma.ru/course/view.php?id=851

Access mode for semester 10: https://educ-amursma.ru/course/view.php?id=852

The test control includes questions on the computer science course studied in secondary (complete) general education institutions.

Current control

Current control includes initial and final control of knowledge.

Initial control **is** carried out by the teacher at the beginning of each lesson in the form of a frontal survey, solving problems and exercises.

Final control – includes control over the technique of performing the experiment and drawing up the protocol, written work on the options, testing in the Moodle system.

Access mode for 4th semester: https://educ-amursma.ru/course/view.php?id=851

Access mode for semester 10: https://educ-amursma.ru/course/view.php?id=852

The final grade during the current knowledge assessment is given on the day of the lesson, as the arithmetic mean result for all types of activities provided for in the given lesson of the discipline's work program.

Criteria for assessing the oral response

- **«5» (excellent)** – the student demonstrates deep and complete knowledge of the educational material, does not allow inaccuracies or distortions of facts when presenting, presents the material in a logical sequence, is well oriented in the presented material, and can provide justification for the judgments expressed.
- **«4» (good)** - the student has mastered the educational material in full, is well oriented in the educational material, presents the material in a logical sequence, but makes inaccuracies when answering.
- **«3» (satisfactory)** – the student has mastered the basic principles of the topic of the practical lesson, but when presenting the educational material, he/she makes inaccuracies, presents it incompletely and inconsistently, requires leading questions from the teacher to present it, and has difficulty substantiating the judgments expressed.
- **«2» (unsatisfactory)** – the student has fragmented and unsystematic knowledge of the educational material, is unable to distinguish between the main and the secondary, makes mistakes in defining basic concepts, distorts their meaning, and cannot independently present the material.

Assessment criteria for the practical part

- **«5» (excellent)** – the student has fully mastered the practical skills and abilities provided for by the course work program.
- **«4» (good)** – the student has fully mastered the practical skills and abilities provided for in the course program, but makes some inaccuracies.
- **«3» (satisfactory)** – the student has only some practical skills and abilities.
- **«2» (unsatisfactory)** – the student demonstrates the performance of practical skills and abilities with gross errors.

Criteria for assessing independent extracurricular work:

- the level of student mastery of the educational material;
- the completeness and depth of general educational concepts, knowledge and skills on the topic being studied, to which this independent work relates;
- development of universal and general professional competencies (ability to apply theoretical knowledge in practice).
- the problems were solved correctly, the exercises were completed, and the test assignments were answered accurately – "passed".
- Problems were not solved correctly, exercises were not completed correctly, test questions were not answered accurately – "failed".

Essay evaluation criteria:

- **«5» (excellent) –** awarded to a student if he has prepared a complete, detailed, and formatted according to requirements, abstract on the chosen topic, presented his work in the form of a report with a computer presentation, and answered questions on the topic of the report;
- **«4» (good) –** awarded to a student for a complete, detailed essay that is formatted according to requirements, but poorly presented;
- **«3» (satisfactory) –** the abstract does not contain information on the issue being studied in full, is formatted with errors, and is poorly presented;
- **«2» (unsatisfactory)** – given to a student if the abstract is not written, or is written with gross errors, the report and computer presentation are not prepared, or their content does not correspond to the topic of the abstract.

Working off disciplinary debts.

1. If a student misses a class for a valid reason, he/she has the right to make it up and receive the maximum grade provided for by the course work program for that class. A valid reason must be documented.
2. If a student misses a class for an unjustified reason or receives a "2" mark for all activities in the class, he/she is required to make it up. In this case, the mark received for all activities is multiplied by 0.8.
3. If a student is excused from a class at the request of the dean's office (participation in sports, cultural and other events), then he is given a grade of "5" for this class, provided that he submits a report on the completion of mandatory extracurricular independent work on the topic of the missed class.

Criteria for assessing midterm assessment.

Midterm assessment (credit in the 4th semester and credit with a grade in the 10th semester) is designed to assess the degree of achievement of planned learning outcomes upon completion of the study of the discipline and allows for an assessment of the level and quality of its mastery by students.

The students' success in mastering the discipline is assessed on a 5-point scale: «5» – excellent, «4» – good, «3» – satisfactory, «2» – unsatisfactory.

«Excellent» - for the depth and completeness of mastery of the content of the educational material, in which the student easily navigates, for the ability to connect theoretical questions with practical ones,

express and justify their judgments, correctly and logically present the answer; when testing, allows up to 10% of erroneous answers. Practical skills and abilities provided for by the working program of the discipline are fully mastered.

«Good» - the student has fully mastered the educational material, is oriented in it, correctly states the answer, but the content and form have some inaccuracies; during testing allows up to 20% of erroneous answers. Completely practical skills and abilities provided by the working program of the discipline, but allows some inaccuracies

«Satisfactory»- the student has mastered the knowledge and understanding of the main provisions of the educational material, but presents it incompletely, inconsistently, does not know how to express and justify his/her judgments; during testing, allows up to 30% of erroneous answers. Has only some practical skills and abilities.

«Unsatisfactory»- the student has fragmented and unsystematic knowledge of the educational material, is unable to distinguish between the main and secondary, makes mistakes in defining concepts, distorts their meaning, presents the material in a disorderly and uncertain manner, and makes more than 30% of erroneous answers during testing. Performs practical skills and abilities with gross errors.

A student can claim to receive an "excellent" grade automatically if he/she has won a prize in disciplinary or interdisciplinary Olympiads (university, regional) and has an average grade for the current academic performance of at least 4.8 points.A student can refuse the "automatic" grade and take the test together with the group on a general basis.

Interim assessment is carried out through a system of passing a test in 3 stages:

1. Testing in the Moodle system:
   Access mode for 4th semester: https://educ-amursma.ru/course/view.php?id=851
   Access mode for semester 10: https://educ-amursma.ru/course/view.php?id=852
2. Completion of the practical part of the discipline in full: involves attending all practical classes, performing experiments with the execution of a protocol. Based on the assessments of the current control of knowledge, skills, and abilities in practical classes, the average score of current academic performance is calculated, which is recorded in the educational (electronic) journal. The average score of the current knowledge control is taken into account during the midterm assessment.
3. Delivery of practical skills (control of the level of development of competencies). Includes 10 options, containing 10 practical questions each.

Assessment criteria for midterm assessment (4th semester)

Stages	Mark out of 5 point scale	Binary scale
Test control in the Moodle system	3-5	**passed**
Complete completion of the practical part of the course	3-5	
Delivery of practical skills (control of the formation of competencies)	3-5	
Test control in the Moodle system	2	**not credited**
Complete completion of the practical part of the course	2	
Delivery of practical skills (control of the formation of competencies)	2	

Assessment criteria for midterm assessment (10th semester)

Stages	Mark out of 5 point scale	Point system
Test control in the Moodle system	3-5	**5 –«excellent» 4 –«good» 3 – «satisfactory»**
Complete completion of the practical part of the course	3-5	
Delivery of practical skills (control of the formation of competencies)	3-5	
Test control in the Moodle system	2	**2 – «unsatisfactory»**
Complete completion of the practical part of the course	2	
Delivery of practical skills (control of the formation of competencies)	2	

2.6 Independent work of students: classroom and extracurricular work.

The organization of independent classroom work of students is carried out with the help of methodological instructions for students, which contain educational goals, a list of the main theoretical questions for study, a list of practical work and the methodology for conducting it, instructions for the presentation of the results obtained, their discussion and conclusions, assignments for self-control with standard answers, a list of recommended literature.

From 1/4 to 1/2 of the practical lesson time is allocated for independent work of students: conducting research, recording results, discussing them, formulating conclusions, completing individual assignments. The preparatory stage, or the formation of an approximate basis for actions, begins for students outside of class time when preparing for the practical lesson, and ends in class.

All subsequent stages are carried out in class. The stage of materialized actions (solving problems using an algorithm or without an algorithm, with an unknown answer in advance) is carried out independently. The teacher, if necessary, provides consultation, provides assistance and simultaneously monitors the quality of students' knowledge and their ability to apply existing knowledge to solve assigned problems.

No. p/p	Topic practical lesson	Time for student preparation for the lesson	Forms of extracurricular independent work	
			Mandatory and the same for all students	**At the student's choice (abstract on topics)**
4th semester				
1	Introduction to medical informatics. Concept of informatization of Healthcare of Russia and Amur Region.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - familiarization with examples of solutions to typical problems completing a practical task (problem) to monitor the assimilation of the topic.	- abstract: "Types of medical information"; - message: "Problems of informatization of healthcare in the Amur region"; - review of magazines and newspapers.

2	Use of information technology in medicine and healthcare.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - familiarization with examples of solutions to typical problems - completing a practical task (problem) to monitor the assimilation of the topic.	- abstract: " Types of information technologies"; - message: "Use of information technologies in medicine".
3	Fundamentals of evidence-based medicine.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - familiarization with examples of solutions to typical problems - completing a practical task (problem) to monitor the assimilation of the topic.	- message: "Fundamentals of evidence-based medicine"; - message: "How is the normality of distribution tested "; - message: "Nonparametric criteria, their advantages"; - message: "Using the methods of mathematical statistics"; - message: "Testing for normal distribution."
4	Preparing documents using a text editor: creating, editing, formatting text to solve medical problems. Technology of working with drawings, creating formulas.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - familiarization with examples of solutions to typical problems - completing a practical task (problem) to monitor the assimilation of the topic."	- making a poster on the topic "Word text editor" - computer presentation on the topic " Word text editor ".
5	Preparing documents using a text editor: embedding objects. Techniques for working with tables, creating diagrams. .	2.25 hours	- preparation for tests (lectures, basic and additional literature); - repeat examples of solutions to typical problems; - Completion of a sample test.	- message: “Technology of working with medical documents (creation of drawings)”; - abstract: "Technology of creating macros in the WORD editor"; - message: "Features of new versions of WORD " .

6	Creating presentations in MS environmentPowerPoint . Interface, main elements and capabilities for solving medical problems.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - familiarization with examples of solutions to typical problems - completing a practical task (problem) to monitor the assimilation of the topic.	- message: « Creating presentations in MS environmentPowerPoint »; - computer presentation on medical topics.
7	Medical resources of the Internet. Telemedicine.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - familiarization with examples of solutions to typical problems - completing a practical task (problem) to monitor the assimilation of the topic.	- computer presentation on the topic “Development of telemedicine in the Amur region”; - review of magazines and newspapers on the topic “Development of telemedicine in the Amur region”; - computer presentation on the topic "Medical resources of the Internet" - abstract on the topic " Telemedicine. Development Prospects".
8	Computer networks in medicine.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - completing a practical task (problem) to monitor the assimilation of the topic.	- computer presentation on the topic "Computer networks in medicine"; - abstract on the topic " Using communication tools for interpersonal communication".
9	Medical information systems.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - completing a practical task (problem) to monitor the assimilation of the topic.	- computer presentation on the topic “Medical information systems in the Amur region”; - review of magazines and newspapers on the topic "Types of MIS in the Amur Region and the city of Blagovesh-

				chensk".
10	Internet tools for searching professional information on individual sections of medical knowledge. Library information systems.	2.25 hours	- preparation for tests (lectures, basic and additional literature); - making a plan to answer questions.	- computer presentation on the topic "Internet tools"; - abstract on the topic " Library information systems".
11	Storing and processing information using spreadsheets: creating, editing, formatting tables.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - completing a practical task (problem) to monitor the assimilation of the topic."	- Excel Spreadsheets " - abstract on the topic "Creating macro commands in Excel".
12	Calculations in spreadsheets: formulas, functions, add-ins	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - completing a practical task (problem) to monitor the assimilation of the topic.	- Excel Spreadsheets " - Excel spreadsheets ".
13	Excel spreadsheets for statistical processing of medical and biological data.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - familiarization with examples of solutions to typical problems - completing a practical task (problem) to monitor the assimilation of the topic.	- Excel Spreadsheets " - abstract on the topic "Creating macro commands in Excel".
14	Study of probabilistic diagnostics using computer technologies.	2.25 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - familiarization with examples of solutions to typical problems - completing a practical task (problem) to monitor the assimilation of the topic.	- abstract on the topics "Method of information-probabilistic diagnostics" and "Main types of medical logic"
15	Standard application	2.25 hours	- preparation for tests (lec-	- abstract on the topic

	software for solving medical problems.		tures, basic and additional literature); - making a plan to answer questions.	"Creation of medical publications based on the use of ready-made templates."
16	Credit lesson	2.25 hours	- preparation for the test (lectures, basic and additional literature); - drawing up a plan to answer questions; - preparing for a test assignment.	
10th semester				
1	Database Fundamentals. Developing a Medical Database.	2.4 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - preparing for a test assignment.	abstract on the topic "Basics of Databases": - filling the database; - entering and editing data in a table; - creating simple shapes; - creating queries; - filtering, searching and sorting data; - placement of new objects; - creating new tables; - creating reports.
2	Developing a relational database in Microsoft Access.	2.4 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - preparing for a test assignment.	abstract on the topic "Basics of Databases": - filling the database; - entering and editing data in a table; - creating simple shapes; - creating queries; - filtering, searching and sorting data; - placement of new objects; - creating new tables; - creating reports.
3	Automated workplace of a doctor.	2.4 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - preparing for a test assignment.	messages on the topic: - «Doctor's ARM»; - «Types of doctor's automated workplace»

4	Study of the probabilistic method of disease diagnosis.	2.4 hours	- preparation for practical classes (lectures, basic and additional literature); - drawing up a plan to answer questions; - preparing for a test assignment.	- abstract on the topics «Method of information-probabilistic diagnostics» and «Main types of medical logic»
5	Credit lesson	2.4 hours	- preparation for the test (lectures, basic and additional literature); - drawing up a plan to answer questions; preparing for a test assignment.	
Labor intensity in hours		36 hours	36 hours	12 hours
Total labor intensity in hours			**48 hours**	

2. 7 Research (project) work

Research (project) work of studentsisa mandatory section of the discipline and is aimed at the comprehensive development of universal and general professional competencies of students. Research (project) workIt involves studying specialized literature and other scientific and technical information about the achievements of domestic and foreign science and technology in the relevant field of knowledge, participation in scientific research, etc. The topics are determined by students independently or in consultation with the teacher.

List of recommended topics for research (project) work:

1. Digital healthcare in the Amur region.
2. Improving information technologies in medical organizations of the Amur region.
3. Protection of personal data in healthcare.
4. Methods for increasing the efficiency of using electronic medical documents in a medical information system.
5. Ensuring information security in medical organizations.
6. Information technology in medicine: untapped opportunities and prospects.
7. Improving algorithms for electronic registration for doctor's appointments.
8. Creation of an automated workstation (AWP) for any doctor.
9. Application of information technologies in medicine.
10. Prospects for informatization of healthcare (using the example of a hospital or clinic)
11. The benefits of using modern information technologies in medicine.
12. The main stages of implementation of an electronic medical record (EMR) of a patient in a medical institution.
13. Possibility of using a polygraph to monitor patient treatment.
14. Artificial intelligence in medicine.
15. Evidence-based medicine: problems and development prospects.
16. Medical resources of the network and the Internet.
17. Use of special programs for molecular research.
18. Information and communication technologies in medicine: modern trends.
19. Approaches to improving patient safety using MIS.

Criteria for assessing students' research (project) work:

- the material on the results of the research in the report is presented in detail, the specialized literature is well-developed, scientific and technical information on the achievements of domestic and foreign science and technology in the relevant field of knowledge is studied - “passed”.
- the material on the results of the research in the report is not presented accurately enough, the special literature is poorly studied, the scientific and technical information on the achievements of domestic and foreign science and technology in the relevant field of knowledge is not studied - "failed".

3. EDUCATIONAL, METHODOLOGICAL, MATERIAL, TECHNICAL AND INFORMATION SUPPORT OF DISCIPLINE

3.1 Main literature:

1. Medical informatics: textbook / edited by T. V. Zarubina, B. A. Kobrinsky - Moscow: GEOTAR-Media, 2022. 464 p. - ISBN 978-5-9704-6273-7. Electronic library system "Student consultant" - ISBN 978-5-9704-4573-0. Access mode: https://www.studentlibrary.ru/book/ISBN9785970462737.html
2. Medical informatics: Textbook and methodological manual / S. Yu. Sokolov, V. A. Teleshov, D. N. Sokolovsky, et al. - Ekaterinburg: UGMU, 2024. - 190 p. - ISBN 9785001680772. - Text: electronic // EBS "Bukap" Access mode:https://www.books-up.ru/ru/book/medicinskaya-informatika-17833606/

3.2 Further reading:

1. Medical informatics: parametric and nonparametric methods of statistics on a computer / N. V. Markina, E. I. Belenkova, G. A. Didenko et al. - Chelyabinsk: TETA, 2022. - 138 p. Electronic library system "Bookap". Access mode: https://www.books-up.ru/ru/book/medicinskaya-informatika-parametricheskie-i-neparametricheskie-metody-statistiki-na-kompyutere-15440733
2. Safronova I. V. Medical informatics: standard applied software in professional activities: Textbook / I. V. Safronova, A. A. Mukasheva. - Chelyabinsk: SUMU, 2023. - 384 p. - ISBN 9785945072602. - Text: electronic // EBS "Bukap": Access mode:https://www.books-up.ru/ru/book/medicinskaya-informatika-standartnye-prikladnye-programmnye-sredstva-v-professionalnoj-deyatelnosti-16548162/

3.3 Educational and methodological support for the discipline prepared by the department staff:

Educational aids (Educational Methodology):

1. Plashchevaya, E. V. Tests for practical work on medical informatics: a teaching aid / E. V. Plashchevaya, N. V. Nigey. - Blagoveshchensk: Amur State Medical Academy of the Ministry of Health of the Russian Federation, 2024. - 131 p.

Electronic and digital technologies:

1. **Online course on the subject** "Medical Informatics" in the EIS FGBOU VO Amur State Medical Academy
   Access mode for 4th semester: https://educ-amursma.ru/course/view.php?id=851
   Access mode for semester 10: https://educ-amursma.ru/course/view.php?id=852
   Characteristics of modules in electronic information and educationalcourse

Educational	Controlling
Theoretical (lecture) material, video experiments, scientific and educational films	Methodological recommendations for students on independent extracurricular work.
Methodological recommendations for students for practical classes. Methodological recommendations for solving problems and exercises on the topics of the discipline.	List of recommended topics for abstracts and guidelines for abstract design.
Reference material, tables of standard values.	Tests of entrance, current and final knowledge control.

2. **Multimedia presentations** (MicrosoftPowerPoint), to lecture-type classes, according to the thematic plan of lectures:

Access mode for 4th semester:https://educ-amursma.ru/course/view.php?id=851

– Introduction to Medical Informatics
– Time Series Analysis
– Introduction to Evidence-Based Medicine
– Information technology in medicine
– Automated workplace of a doctor
– Medical information system
– Medical Application of Computer Networks. Medical Resources Internet
– Telemedicine. Telemedicine technologies.
– Artificial intelligence in medicine. Neural networks.
– Multimedia technologies. Technology for creating and conducting computer presentations.

Access mode for 10th semester:https://educ-amursma.ru/course/view.php?id=852

- Database Basics.
- MIS. Electronic health care.
- Telecommunication technologies in medicine.
- Automated workplace of a doctor.

3. **Video materials:**

- Interactive video course Excel.
- Interactive video course Word.
- Medical and biological statistics. Basic training video course.
- Statistics in Excel. Basic training video course.

4. **Electronic teaching aids:**

(placed in the Electronic Information System of the Federal State Budgetary Educational Institution of Higher Education Amur State Medical Academy. Access mode:
Access mode for 4th semester: https://educ-amursma.ru/course/view.php?id=851
Access mode for semester 10: https://educ-amursma.ru/course/view.php?id=852

3.4 Equipment used for the educational process

No. p/p	Name	Quantity
1.	**Room for practical classes: DK - 1**	
	Board	1
	Teacher's desk	1
	Study table	4
	Computer desk	13
	Computers	18
	Set of headphones	18
	Chairs	20
	Handout kit	30
2.	**Room for practical classes: DK - 2**	
	Board	1
	Teacher's desk	1
	Study table	4
	Computer desk	13
	Computers	17
	Set of headphones	17
	Chairs	20
	Handout kit	30
3.	**Room for practical classes: DK - 3**	1
	Board	1
	Teacher's desk	1
	Computer desk	13
	Set of headphones	13
	Computers	13
	Chairs	20
	Handout kit	30
4	**Practical training room: Workshop 2**	2
	Board	1
	Teacher's desk	1
	Chairs	20
	Study table	10
	Handout kit	30
5	**Room for independent work of students, workshop 3**	
	Board	1
	Teacher's desk	1
	Chairs	20
	Study table	7
	Handout kit	60

3.5. Professional databases, information and reference systems, electronic educational resources.

Name resource	Resource Description	Access	Resource address
ELECTRONIC LIBRARY SYSTEMS			
"Student consultant. Electronic library of the medical university"	For students and teachers of medical and pharmaceutical universities. Provides access to electronic versions of textbooks, teaching aids and periodicals.	Remote access after registration under the university profile	https://www.studentlibrary.ru/
Reference and information system "MedBaseGeotar".	The reference and information system "MedBaseGeotar" is intended for practicing medical specialists, researchers, teachers, postgraduate students, residents, senior students, and healthcare managers for the rapid search, selection, and reading of medical literature necessary for work in a single data source.	Remote access after registration under the university profile	https://mbasegeotar.ru/pages/index.html
Electronic library system "Bookup"	Large medical library - information and educational platform for the joint use of electronic educational, educational and methodological publications of medical universities of Russia and the CIS countries	Remote access after registration under the university profile	https://www.books-up.ru/
EBS "Lan"	Network electronic library of medical universities - an electronic database of educational and scientific works on medical topics, created for the purpose of implementing network forms of professional educational programs, open access to educational materials for partner universities	Remote access after registration under the university profile	https://e.lanbook.com/
Scientific electronic library "CyberLeninka"	CyberLeninka is a scientific electronic library built on the paradigm of open science (Open Science), the main tasks of which are the popularization of science and scientific activity, public control of the quality of scientific publications, the development of interdisciplinary research, a modern institute of scientific review, increasing the citation of Russian science and building a knowledge infrastructure. Contains more than 2.3 million scientific articles.	free access	https://cyberleninka.ru/
Oxford Medicine Online	A collection of Oxford Press medical publications, bringing together over 350 titles into a single, cross-searchable resource. Publications include The Ox-	free access	http://www.oxfordmedicine.com

	ford Handbook of Clinical Medicine and The Oxford Textbook of Medicine, both of which are continually updated electronically.		
Human Biology Knowledge Base	Reference information on physiology , cell biology , genetics , biochemistry , immunology , pathology . (Resource of the Institute of Molecular Genetics of the Russian Academy of Sciences .)	free access	http://humbio.ru/
Medical online library	Free reference books, encyclopedias, books, monographs, abstracts, English-language literature, tests.	free access	https://www.medlib.ru/library/library/books
INFORMATION SYSTEMS			
Clinical Guidelines Rubricator	A resource of the Russian Ministry of Health that contains clinical recommendations developed and approved by medical professional non-profit organizations of the Russian Federation, as well as methodological guidelines, nomenclatures and other reference materials.	Link to download the application	https://cr.minzdrav.gov.ru/#!/
Federal Electronic Medical Library (FEMB)	The Federal Electronic Medical Library is part of the unified state information system in the field of healthcare as a reference system. FEMB was created on the basis of the funds of the Central Scientific Medical Library named after I.M. Sechenov.	free access	https://femb.ru/
Russian Medical Association	Professional Internet resource. Objective: to promote effective professional activity of medical personnel. Contains the charter, personnel, structure, rules of entry, information about the Russian Medical Union.	free access	http://www.rmass.ru/
Web-medicine	The site presents a catalog of professional medical resources, including links to the most authoritative subject sites, journals, societies, as well as useful documents and programs. The site is intended for doctors, students, employees of medical universities and scientific institutions.	free access	http: //webmed.irkutsk.ru/
DATABASES			
World Health Organization	The site contains news, statistics on countries that are members of the World Health Organization, fact sheets, reports, WHO publications and much more.	free access	http://www.who.int/ru/
Ministry of	The website of the Ministry of Science	free access	http://www.minobrnauki.g

Science and Higher Education of the Russian Federation	and Higher Education of the Russian Federation contains news, newsletters, reports, publications and much more.		ov.ru
Ministry of Education of the Russian Federation	The website of the Ministry of Education of the Russian Federation contains news, newsletters, reports, publications and much more.	free access	https://edu.gov.ru/
Federal portal "Russian education"	A single window for access to educational resources. This portal provides access to textbooks on all branches of medicine and health care.	free access	http: //www .edu.ru/
Polpred.com	Electronic library system Business media. Media review	free access	https://polpred.com/news
BIBLIOGRAPHICAL DATABASES			
Database "Russian Medicine"	It is created in the Central Scientific and Methodological Library and covers the entire collection, starting from 1988. The database contains bibliographic descriptions of articles from domestic journals and collections, dissertations and their abstracts, as well as domestic and foreign books, collections of institute proceedings, conference materials, etc. Thematically, the database covers all areas of medicine and related areas of biology, biophysics, biochemistry, psychology, etc.	free access	https://rucml.ru/
PubMed	A text database of medical and biological publications in English. The PubMed database is an electronic search engine with free access to 30 million publications from 4,800 indexed journals on medical topics. The database contains articles published from 1960 to the present day, including information from MEDLINE, PreMEDLINE, NLM. Each year, the portal is replenished with more than 500 thousand new works.	free access	https :// pubmed . ncbi . nlm . nih . gov /
eLIBRARY.RU	Russian information portal in the field of science, technology, medicine and education, containing abstracts and full texts of more than 13 million scientific articles and publications. The eLIBRARY.RU platform provides electronic versions of more than 2,000 Russian scientific and technical journals, including more than 1,000 open access journals.	Full functionality of the site is available after registration	http://elibrary.ru/defaultx.asp

Electronic library of dissertations (RSL)	Currently, the Electronic Library of Dissertations of the Russian State Library contains more than 919,000 full texts of dissertations and abstracts.	free access	http://diss.rsl.ru/?menu=disscatalog/
Medline.ru	Medical and biological portal for specialists. Biomedical journal.	free access	https://journal.scbmt.ru/jour/index
Official Internet portal of legal information	The single official state information and legal resource in Russia	free access	http://pravo.gov.ru/

3.6. Licensed and freely distributed software used in the educational process.

List of software (commercial software products).

No. p/p	List of software (commercial software products)	Details of confirming documents documents
1.	MS Operating System Windows 7 Pro	License number 48381779
2.	MS Operating System Windows 10 Pro	CONTRACT No.UT-368 from 09.21.2021
3.	MS Office	License number: 43234783, 67810502, 67580703, 64399692, 62795141, 61350919
4.	Kaspersky Endpoint Security for Business – Standard Russian Edition. 50-99 Node 1-year Educational Renewal License	Agreement No. 7 AA dated 02/07/2025
5.	1C Accounting and 1C Salary	LICENSE AGREEMENT 612/L dated 02.02.2022 (additional licenses)
6.	1C: PROF University	LICENSE AGREEMENT No. KrTsB-004537 dated 12/19/2023
7.	1C: PROF Library	LICENSE AGREEMENT No. 2281 dated 11.11.2020
8.	Consultant Plus	Contract No. 41AA dated 12/27/2024
9.	Contour.Tolk	Agreement No. K213753/24 dated 13.08.2024
10.	E-learning environment 3KL (Russian Moodle)	Agreement No. 1362.5 dated November 20, 2024
11.	Astra Linux Common Edition	Agreement No. 142 A dated September 21, 2021
12.	Information system "Plans"	Agreement No. 2873-24 dated June 28, 2024
13.	1C: Document Management	Agreement No. 2191 dated 10/15/2020
14.	R7-Office	Agreement No. 2 KS dated 12/18/2020
15.	License "OS ROSA CHROME workstation"	Agreement No. 88A dated 08/22/2024
16.	Alt Virtualization Server 10 (for secondary specialized and higher professional education)	Agreement No. 14AK dated 09/27/2024
17.	Dr.Web Desktop Security Suite Comprehensive protection + Control Center for 12 months.	Agreement No. 8 dated October 21, 2024
18.	Software "Schedule for educational institu-	Agreement No. 82A dated July 30, 2024

	tions"	

List of freely distributed software

No. p/p	The list is free distributed software	Links to license agreement
1.	Yandex Browser	Freely distributed License Agreement for the Use of Yandex Browser Programs https://yandex.ru/legal/browser_agreement/
2.	Yandex.Telemost	Freely distributed License agreement for the use of programs https://yandex.ru/legal/telemost_mobile_agreement/
3.	Dr.Web CureIt!	Freely distributed License Agreement: https://st.drweb.com/static/new-www/files/license_CureIt_ru.pdf
4.	OpenOffice	Freely distributed License: http://www.gnu.org/copyleft/lesser.html
5.	LibreOffice	Freely distributed License:https://ru.libreoffice.org/about-us/license/
6.	VK Calls	Freely distributed https://vk.com/license
7.	Kaspersky Free Antivirus	Freely distributed https://products.s.kaspersky-labs.com/homeuser/Kaspersky4Win2021/21.16.6.467/english-0.207.0/3830343439337c44454c7c4e554c4c/kis_eula_en-in.txt

3.7. Resources of the information and telecommunications network "Internet"

- Library of Amur State Medical Academy. Access mode: https://amurgma.ru/obuchenie/biblioteki/biblioteka-amurskoy-gma/
- Electronic library system "Student consultant". Access mode: https://www.studentlibrary.ru

4. ASSESSMENT TOOLS FUND

4.1. Current test control (input, initial, output), final.

4.1.1 Examples of entrance control test tasks (with standard answers)

Test assignments are located in the Moodle system.
Access mode for 4th semester:https://educ-amursma.ru/course/view.php?id=851
Total number of tests – 100.

1. INFORMATICS:
    1) area of human activity associated with the processes of transformation and use of information with the help of computer technologies
    2) the science of the structure of a computer and the ways of its application in various areas of human activity
    3) a discipline that is designed to develop the ability to interact with a computer
    4) the science of general properties and patterns of information
2. EXTERNAL MEMORY IS REQUIRED FOR:
    1) for long-term storage of information after the computer is turned off
    2) to store frequently changing information during the process of solving a problem, a computer
    3) to process current information
    4) for permanent storage of information about the computer's operation
3. COMPUTER SPEED DEPENDS ON:
    1) clock frequency of information processing in the processor
    2) presence or absence of a connected printer
    3) organization of the operating system interface
    4) external storage device capacity

Answer standards: 1-1; 2-1; 3-1.

Access mode for semester 10:https://educ-amursma.ru/course/view.php?id=852
Total number of tests – 100.

1. SUBJECT OF STUDY OF MEDICAL INFORMATICS:
    1) medical information
    2) information processes in medicine
    3) computer
    4) information Technology
2. OBJECT OF STUDY OF MEDICAL INFORMATICS
    1) medical information
    2) information processes in medicine
    3) computer
    4) information Technology
3. MEDICAL INFORMATICS IS:
    1) a scientific discipline that studies quantitative patterns, the state and dynamics of the population, and health care systems
    2) a scientific discipline related to the development, design and production of medical electronic devices and apparatus
    3) a scientific discipline that studies the processes of obtaining, transmitting, processing, storing, distributing, and presenting information using information technology and technology in medicine and healthcare

4) a set of data on patients and diseases that is formed through their interaction with methods that are adequate to them and that removes the uncertainty and incompleteness of prior knowledge

Answer standards: 1-1; 2-4; 3-3.

4.1.2 Examples of test tasks for initial control (with standard answers)

Test assignments are located in the Moodle system.
Access mode for 4th semester:https://educ-amursma.ru/course/view.php?id=851
Total number of tests – 200.

1. THE INTERNET IS:
   1) local area network
   2) corporate network
   3) global network
   4) regional network

2. MICROSOFT WORD IS:
   1) text file
   2) spreadsheet editor
   3) text editor
   4) notebook

3. A COMPUTER THAT PROVIDES ITS RESOURCES TO OTHER COMPUTERS IN THEIR JOINT WORK IS CALLED:
   1) switchboard
   2) server
   3) modem
   4) adapter

Answer standards: 1-3; 2-3; 3-2.

Access mode for semester 10:https://educ-amursma.ru/course/view.php?id=852
Total number of tests – 200.

1. THE MAIN SCREEN OF THE EMC (SUMMARY) CONSISTS OF:
   1) title page , general anamnesis , history of observations and examination results
   2) EHR examination filling screen , disease diagnosis , medical history
   3) electronic medical record, patient protocol management, personal data
   4) examination record screen , examination results , patient information

2. WHAT MEDICAL INFORMATION SYSTEMS ARE USED IN MEDICAL INSTITUTIONS (MEDICAL AND PREVENTIVE INSTITUTIONS) :
   1) Medialogue , Patient , Avicenna
   2) Russian Medical Information System , Doctor, Patient
   3) Accent , Health, Medicine
   4) Therapist , Alternative, Kolos

3. ADVANTAGES OF THE MEDIALOG SYSTEM:
   1) functional completeness , flexible settings , user-friendly interface , simplicity and scalability
   2) increased accessibility , simplicity, flexibility of settings ,integration

3) regulation of patient flows , completeness of information
4) reduction of patient service time , flexibility of settings ,quality of service

Answer standards: 1-1; 2-1; 3-1.

4.1.3 Examples of test tasks for final control (with standard answers)

Test assignments are located in the Moodle system.
Access mode for 4th semester:https://educ-amursma.ru/course/view.php?id=851
Total number of tests – 200.

1. IN THE TEXT EDITOR WHEN SETTING PAGE PARAMETERS THE FOLLOWING ARE SET:
   1) fields, orientation, size
   2) typeface, size, style
   3) indent, interval
   4) style, template

2. WHAT IS THE AVERAGE DATA TRANSFER RATE ON THE INFRORED CHANNEL
   1) 5-10 Mbps
   2) 500 Mbps
   3) 1 Gbps
   4) 10 Gbps

3. A DOCUMENT CREATED IN MICROSOFT EXCEL IS CALLED:
   1) workbook
   2) working field
   3) working line
   4) working column

Answer standards: 1-1; 2-1; 3-1.

Access mode for semester 10:https://educ-amursma.ru/course/view.php?id=852
Total number of tests – 200.

1. AUTOMATED WORKPLACE IS:
   1) hardware and computer complex
   2) software and computer complex
   3) personal computer
   4) medical computer program
2. MEDICAL DATABASE IS:
   1) an organized collection of data intended for long-term storage, continuous updating and use
   2) product of user requests
   3) a fairly large set of well-structured data in the field of medicine on machine-readable media, according to uniform rules
   4) a set of medical records from various medical institutions
3. DICOM STANDARD 3 IS:
   1) digital imaging and exchange in medicine, designed to transfer medical images between computers
   2) software designed to work with databases: their definition, creation, support, implementation of controlled access

3) software designed to work with databases: their definition, creation, support, implementation of controlled access
4) digital images designed to help make a correct diagnosis

Answer standards: 1-1; 2-1; 3-1.

4.1.4 Examples of test tasks for assessing practical skills (with standard answers)
Test assignments are located in the Moodle system.
Access mode for 4th semester:https://educ-amursma.ru/course/view.php?id=851
Total number of tests – 200.

1. CHOOSE THE CORRECT FORMULA:
   1) =C245*M67
   2) A123+O1
   3) A2+B4
   4) K5*B4
2. 1 Gbps is equal to:
   1) 1024 Mbps
   2) 1024 MB/s
   3) 1024 kbps
   4) 1024 bytes/s
3. WHAT IS THE AVERAGE DATA TRANSFER RATE VIA INFRORED CHANNEL:
   1) 2 5-10 Mbps
   2) 500 Mbps
   3) 1 Gbps
   4) 10 Gbps

Answer standards: 1-1; 2-1; 3-1.

Access mode for semester 10:https://educ-amursma.ru/course/view.php?id=852
Total number of tests – 200.

1. MEDICAL DATA IS:
   1) product of user requests
   2) product of doctors' requests
   3) product of user and physician requests
   4) product of medical information requests

2. AVICENNA :
   1) is a multifunctional system that provides support for the entire technological cycle of a medical institution
   2) consists of modules, each module contains specific functionality that allows a medical institution to automate certain types of its activities
   3) includes the development of MIS: doctor's automated workplace, computerization of patient records, use of electronic medical records, management of projects for informatization of medical and preventive institutions (MPI)
   4) a software product designed to support the work of a medical institution

3. THE MAIN UNIT OF DATA ACCUMULATION AND STORAGE IN MEDICINE IS:
   1) patient
   2) doctor
   3) program

4) electronic map

Answer standards: 1-1; 2-1; 3-1.

4.1.5 Examples of test tasks for the final assessment (with standard answers)

Test assignments are located in the Moodle system.
Access mode for 4th semester:https://educ-amursma.ru/course/view.php?id=851
Total number of tests – 200.

1. THE MAIN TYPES OF MEDICAL LOGIC INCLUDE:
    1) deterministic logic, phase interval method, information-probabilistic logic
    2) logic of emotions, metalogic, modal logic
    3) formal logic, vital logic
    4) chaotic, analytical, synthetic, perfect
2. MEDICAL INFORMATION MEASURES:
    1) syntactic, semantic, pragmatic
    2) pragmatic, non-verbal, semantic
    3) syntactic, biophysical, pragmatic
    4) syntactic, pragmatic, biophysical

3. EXAMPLES OF AUDIBLE SIGNALS GENERATED BY MEDICAL EQUIPMENT ARE:
    1) Doppler blood flow signals in echocardiography, signals from medical devices
    2) tones, noises, wheezing
    3) Commentary of the attending physician, speech of a patient with laryngeal pathology
    4) X-rays, echocardiograms

Answer standards: 1-1; 2-1; 3-1.

Access mode for 10th semester:https://educ-amursma.ru/course/view.php?id=852
Total number of tests – 200.

1. WHAT IS THE MOST COMMON FORM OF ELECTRONIC DOCUMENT IN MEDICAL INSTITUTIONS?
    1) electronic medical record
    2) electronic registration
    3) electronic medical record
    4) electronic doctor's appointment

2. AUTOMATED WORKPLACE (AWP) IS:
    1) hardware and computer complex
    2) software and computer complex
    3) medical computer program
    4) Doctor's personal computer

3. AN ELECTRONIC DOCUMENT IS:
    1) information presented in the form of a set of states of elements of electronic computing equipment for processing, storing and transmitting information
    2) software designed to work with databases: their definition, creation, support, implementation of controlled access

3) aggregate information about a patient that is compiled and stored in the automated information database of a medical institution and its network
4) an organized collection of data intended for permanent use only

Answer standards: 1-1; 2-1; 3-1.

4.2 Situational tasks, exercises

For 4th semester:

Example No. 1.

The time of death of animals (in minutes) after the introduction of a toxic substance was studied. Row X is the control group, in which treatment was not carried out; row Y- experimental group, below which a certain treatment was carried out.

X	6	25	25	30	38	39	44		n =7
Y	8	30	32	41	41	46	68	100	n =8

To determine whether there are differences in the timing of animal death.

Solution:

Let us formulate hypotheses:

H_0 : The time of death of animals in the experimental group is not less than the time of death of animals in the control group.

H_1 : The time of death of animals in the experimental group is less than the time of death of animals in the control group.

Let's formulate the solution to the problem in a table.

X		Y	
Time of death of animals	Rank	Time of death of animals	Rank
25	3.5	8	2
6	1	30	5.5
25	3.5	42	11
38	8	32	7
30	5.5	41	10
39	9	68	14
44	12	100	15
		46	13
Sum	42.5		77.5

Determine the larger of the two rank sums: $T_x = 77.5$, it corresponds to sample Y with $n_x = 8$.

Let's determine the value of the Mann-Whitney U test:

$$U = 7 \cdot 8 + \frac{8 \cdot (8+1)}{2} - 77{,}5 = 56 + 36 - 77{,}5 = 14{,}5 .$$

From the table in Appendix 1 we find the tabular values of the U -criterion. For $n_1 = 7$ and $n_2 = 8$ $U_{0.05} = 13$, $U_{0.01} = 7$.

We compare the obtained value U = 14.5 with the table values:

14.5 > 13, therefore the null hypothesis is accepted.

Conclusion: the differences obtained in the experimental and control groups are random. Therefore, the treatment should not be considered the reason for the prolongation of the life of animals that were administered the toxic substance.

Example No. 2.

was measured before and after the administration of antibiotics.

Sick	Bilirubin level	
	before introduction	after administration
A	68	110
B	83	101
IN	70	120
G	100	180
D	110	100
E	100	100
AND	180	240
Z	60	120
AND	200	160
TO	210	300

To determine whether the administration of antibiotics affects the increase in bilirubin in bile.
Solution:

Let us formulate hypotheses:
H_0: Administration of antibiotics does not affect the increase in bilirubin in bile.
H_1: Administration of antibiotics affects the increase of bilirubin in bile.
Let's formulate the solution to the problem in a table.

Sick	Bilirubin level		Difference	Ranks
	before introduction	after administration		
A	68	110	+42	4
B	83	101	+18	2
IN	70	120	+50	5
G	100	180	+80	8
D	110	100	-10	1
E	100	100	0	
AND	180	240	+60	6.5
Z	60	120	+60	6.5
AND	200	160	-40	3
TO	210	300	+90	9

1) Sum of ranks of values with positive change:
4 + 2 + 5 + 8 + 6.5 + 6.5 + 9 = 41,
sum of ranks with value minus 1 + 3 = 4.
2)The smaller of the sums (T = 4) is estimated for a number of pairs of observations equal to 9 .
3) Using the table in Appendix 2, we find the tabular values of the T-criterion. For n = 9, $T_{0.05} = 8$, for $T_{0.01} = 3$.
We compare the obtained value T = 4 with the table values.
3 <4 <8
4) Consequently, with a probability greater than 95% and less than 99%, it can be stated that the administration of antibiotics has a reliable effect on the increase in bilirubin in bile.

Example No. 3.

As a result of the examination, the patient was found to have the following symptoms:
S_2 - abdominal pain,
S_4 - leukocytosis,
S_9 - ECG change,
S_{10} - pale skin,
S_{11} - increased heart rate,
S_{13} - depression of reflexes,
S_{14} - abdominal wall tension,
S_{15} - bloating
Based on the established symptom complex, calculate the probabilities of four possible diseases:
$P(D_1/S_{ci})$ - myocardial infarction,
$P(D_2/S_{ci})$ - peritonitis,
$P(D3/Sci)$ - lobar pneumonia,
$P(D_4/S_{ci})$ - pulmonary embolism.
Draw a conclusion about the most likely pathology.
When solving the given problem, use a ready-made diagnostic table of conditional probabilities.

For 10th semester:

Example No. 1.

Get acquainted with all the possibilities of the MIS "Medialog". Mark what functions this MIS performs, and, using the table"Functions of medical information systems" , draw a conclusion, to which class of MIS it belongs. *Instructions: make your notes with a plus (+). Your conclusion must be written after the table. Draw a conclusion.*

Item No.	Functions of information systems	IS classes
1	Information support for the processes of diagnosis, treatment and rehabilitation of patients	
2	Information support for doctors' activities (pharmacological databases, guidelines for the use of drugs, patient management protocols)	
3	Personal patient records, maintenance and processing of medical documents	
4	Accounting for medical care and medical services provided to patients, determining the need for basic types of medical care; assessing, monitoring and ensuring the quality of medical care	
5	Calculation of standards and tariffs for payment for medical care provided; organization of mutual settlements between healthcare institutions	
6	Accounting, planning of financial and material resources and management of healthcare institutions	
7	Monitoring the state of the medical, demographic and epidemiological situation	
8	Collection and processing of medical statistical data, monitoring of the health status of the population, preparation and submission of state medical statistical reports, analysis of statistical data	
9	Support for decision-making, including on the basis of modern knowledge bases, logical inference methods, expert systems, etc.	
10	Information exchange between healthcare IS, as well as IS of other departments (social protection, education, etc.) in standard exchange formats	
11	Support of telemedicine technologies (telemonitoring, telemedicine consultations and boards, videoconferencing, access to remote information resources)	
12	Access to Internet resources; creation and support of own Internet information resources.	

Item No.	Functions of information systems	IS classes
13	Support for the processes of training, preparation and retraining of specialists	
14	Maintaining a database of regulatory and reference documentation	
15	Automation of document flow in the institution	

Example No. 2.
You need to process the results of a survey of patients at the Health Center. The data received included information on gender, age (20-40 years), body weight (kg), height (cm). Create a database containing 20 records and complete the following task:

1. Insert the BMI column after the height field and calculate the body mass index using the formula: BMI = body weight (kg)/height (m)2
2. Use the AutoFilter to select men and women aged 25 to 35 years and calculate the average BMI values using the =SUBTOTALS function
3. Make a table on sheet 2 according to the example and insert the obtained results into it.

Floor	Average BMI values
Husband	
Women	

Example No. 3.
The patient suffers from ischemic heart disease. After a long walk in the park, he developed chest pains. Out of fear, he went to see a cardiologist that same day. After the examination, the doctor reassured the patient with a harmless diagnosis. The doctor suggested monitoring the patient's health using telemedicine technologies.

1. What information can be included in a patient's medical history?
2. What type of telemedicine technologies can be offered to the patient? Justify your answer.
3. What communication channels should be used in this case?

4.3 List of practical skills that a student should have after mastering the discipline.

- use educational, scientific, popular science, reference literature, and the Internet;
- predict and interpret research results;
- solve typical practical problems;
- solve situational problems based on theoretical knowledge;
- carry out text and graphic processing of documents using standard computer software;
- use a computer to perform statistical processing of available data;
- work with databases and spreadsheets to improve medical practice;
- writing an abstract on a chosen topic;
- possess skills in organizing occupational health and safety measures when working with equipment.

4.4 List of questions for the test

4th semester (2nd year)

1. Evidence-based medicine: definition, advantages of using the principles of evidence-based medicine, main sections.
2. What is the principle of evidence-based treatment?
3. What is the principle of evidence-based healthcare?
4. Data types in statistical analysis.
5. General population. Sample.
6. Stages of statistical data analysis. Basic characteristics of distribution.
7. Classification of statistical analysis methods.
8. Nonparametric tests, their advantages.
9. Mann-Whitney test, Wilcoxon test.
10. What is Time Series Analysis?
11. Time series: definition, constituent elements.
12. Classification of time series.
13. What is a trend?
14. Methods of representing a trend.
15. Main types of trend.
16. Methods used to directly identify a trend.
17. Fisher's criterion.
18. What are "Medical Information Systems"?
19. What is "Medical Informatics"?
20. Subject, object and purpose of medical informatics.
21. What is "Information" and "Medical Information"?
22. How does the biosignal get converted into medical information? Explain.
23. What types of medical information are there?
24. What components ensure the degree of accessibility of medical information?
25. How is information classified according to its relevance? Explain.
26. What is "Healthcare Informatics"?
27. What is the main goal of healthcare informatization?
28. List the functions of healthcare informatization. Explain.
29. List the tasks of development of healthcare informatization?
30. How is healthcare informatization taking place in the Amur Region?
31. The concept of information technology.
32. What is called an information service?
33. List the types of software products.
34. List the properties of information technology.
35. The importance of information technology in medicine.
36. Levels of information technology in medicine.
37. Types of information technologies. Provide a description of each type.
38. Medical information processing technology.
39. Problems of implementation of modern information technologies in medicine and ways to solve them.
40. Basic concepts and types of SPPVR.

41. The main tasks of the SPVR and ways to solve them.
42. Efficiency of the systems for applying the SPVR.
43. What is the purpose of medical technology information systems?
44. What functions do medical technology information systems provide?
45. In which departments of the healthcare facility are automated systems for processing medical signals and images used?
46. Describe the capabilities of a modern automated system for processing medical signals and images?
47. Give a definition of an expert system. Name its main feature.
48. What are the requirements for expert systems?
49. What basic functions are implemented in an expert system?
50. What are computer monitor systems intended for?
51. What functions does the monitor-computer system provide?
52. Name the forms of information presentation in the monitor-computer system.
53. General information about the global Internet.
54. The most popular Internet services.
55. Browsing and navigation programs (browsers).
56. The most popular browsers.
57. Principles of searching for information on the Internet.
58. Medical resources on the Internet.
59. Classification of medical resources and Internet services.
60. Telemedicine.
61. Directions in the use of telecommunication technologies.
62. History of telemedicine.
63. Standardization of information in telemedicine.
64. Telemedicine centers.
65. What is a text editor?
66. List the main elements of the Microsoft Office Word 2007 interface. What are they for?
67. What is a "Header Row"? What does it contain? Describe it.
68. Word Menu Bar? What tabs does it consist of?
69. Describe the Menu Bar tab.
70. What is the «Toolbar»**?** What is it for?
71. Describe the "Toolbar " tab
72. What is an information system? What is it intended for?
73. What is a medical information system (MIS)?
74. List the functions of MIS.
75. What properties should a MIS have?
76. List the main objectives of MIS.
77. Classification of medical information systems by levels. Describe each level.
78. What types of activities should be automated based on MIS?
79. List the main requirements for the composition of the MIS.
80. List the main types of MIS and their purpose.
81. List the medical information systems for medical and preventive institutions and describe them.
82. What is Microsoft Excel used for?
83. What is a spreadsheet?

84. What tasks can a spreadsheet solve?
85. List the main types of data.
86. Purpose of computer networks.
87. Information channel capacity.
88. Classification of computer networks.
89. Local area network topology.
90. Physical transmission media in local area networks.
91. Special medical computer networks.
92. What is diagnostics?
93. Describe the stages of information processing in the doctor-patient system.
94. What is called a diagnostic algorithm?
95. The concept of a symptom complex.
96. What is machine diagnostics?
97. Characteristics of the main types of medical logic in machine diagnostics.
98. What is the purpose of medical technology information systems?
99. Describe the capabilities of a modern automated system for processing medical signals and images.
100. What systems stand out among automated systems for advisory assistance in decision making?

10th semester (5th year)

1. Databases. Stages of development. Requirements, advantages and disadvantages.
2. Basics of working in Microsoft Access, the concept of a database
3. Basic principles of working in Microsoft Access.
4. Database management system in Microsoft Access.
5. Creating, maintaining and processing a database in Microsoft Access.
6. Table structure and data types in Microsoft Access.
7. Methods for creating databases in Microsoft Access.
8. Database objects and types.
9. Provide a definition of "Electronic Medical Record (EMR)".
10. List the principles of the electronic medical record concept.
11. What accounting objects are used when forming an EMC?
12. List the main advantages of an EHR over a paper card.
13. List the main disadvantages of electronic medical records.
14. List the prospects for the development of EHR.
15. What is meant by the Electronic Medical Record module?
16. Capabilities of the EMC module.
17. Advantages of the EMC module.
18. What is included in the main EHR screen (summary)?
19. Tell us about the system screen form "Title Page".
20. What information is entered on the "Title Page"? List it.
21. Tell us about the system screen form "Observations and Analysis". What information is displayed there?
22. List the tools designed to speed up typing.
23. Tell us about the discovery and creation of the patient's EHR.
24. How is information entered into the EHR?
25. Tell us about external databases in the EHR.

26. How does one work with graphic documents in the EHR?
27. What sections does the "Unified Electronic Medical Record" in Russia consist of? Explain each section.
28. What is an "Automated Workplace (AWP)"?
29. What components are included in the ARM?
30. List the general principles of creating an automated workplace.
31. What is the structure of the ARM?
32. What are the different ARM groups? Describe each group.
33. What is a medical database?
34. What is medical data?
35. What types of medical databases are there?
36. What is an electronic document?
37. What is meant by electronic medical record?
38. List the advantages of maintaining an electronic medical record.
39. What is the structure of the electronic medical record?
40. What is the HL-7 standard? What does it include?
41. What is the purpose of the "DICOM 3" standard?
42. The concept of telemedicine and telemedicine technologies.
43. Regulatory documents.
44. Main areas of application of telemedicine technologies.
45. Main functions and areas of application of telemedicine systems.
46. Distance education in medicine.
47. Home telemedicine.
48. Prospects for the development of telemedicine in Russia.
49. Clinical application of telemedicine technologies.
50. What is diagnostics?
51. Describe the stages of information processing in the doctor-patient system.
52. What is called a diagnostic algorithm?
53. The concept of a symptom complex.
54. What is machine diagnostics?
55. Characteristics of the main types of medical logic in machine diagnostics.
56. What is $P(S_i/D_j)$? Methodology for calculating this value for the diagnostic table.
57. How is the probability of the symptom complex $P(S_{ci}/D_j)$ calculated?
58. What is prior probability and how is it calculated?
59. How does prior probability affect the diagnostic outcome?
60. Bayes' formula.