

Federal State Autonomic Educational Institution of Higher Education
«Peoples' Friendship University of Russia»

Medical Institute

Recommended MCSD

THE WORKING PROGRAM OF THE DISCIPLINE

Subject

Mathematics

Recommended for the direction of training (specialty)

31.05.01 General Medicine

Program (profile, specialization)

General Medicine

- Goals and objectives of the discipline:** formation and development of competencies aimed at using apply methods of mathematical analysis for solving the assigned tasks, acquire new mathematical and natural science knowledge using modern educational and information technologies
- Place of discipline in the structure of high education program:**
Mathematics, Natural sciences;
To study the discipline student should know: mathematical methods for solving intellectual problems and their use in medicine, using educational, scientific, popular scientific literature.

Table 1. Prior and subsequent disciplines aimed at the formation of competencies

No.	Code and name of competence	Previous disciplines	Subsequent disciplines (groups of disciplines)
General Professional Competences			
	GPC-6.3, GPC-6.4.		Biostatistics, medical informatics, public health and healthcare
Professionally specialized competences of specialization _____			

3. Requirements for the results of the discipline:

The discipline program is designed to form the following competencies:

Table 2

Formed competencies

Competences	Name of competence	Competence achievement indicators
GPC-6	GPC 6 - Able to use in professional activity the basic laws of physics, chemistry, earth sciences and biology, apply methods of mathematical analysis and modeling, theoretical and experimental research, acquire new mathematical and natural science knowledge using modern educational and information technologies	GPC-6.3. Can apply the methods of mathematical analysis and modeling for solving the assigned tasks. GPC-6.4. Applies modern educational and information technologies to obtain new mathematical and natural science knowledge.

As a result of studying the discipline student should:

To know:

- Theoretical base of mathematical analysis

Be able to:

- acquire mathematical knowledge using modern educational and information technologies.

Have skills:

- to solve assigned tasks

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

The total labor intensity of the discipline "Mathematics" in the curriculum of the specialty "General Medicine" is 2 credit - 72 hours, 18 weeks.

Type of educational work		Total	semester
		hours	1
Class hours (total)		34	34
Including:		-	-
Lectures		-	-
Practice work (PW)			
Seminars (S)		34	34
Laboratory work (LW)			
Selfwork (total)		2	2
Including:			
Course project (work)			
Cash-graphic work			
Summary			
<i>Other types of selfwork</i>		2	2
Type of interim assessment (credit, examen)			
Total laboriousness	hours	72	72
	credits	2	2

5. Discipline contents

5.1. Content of the discipline's sections

Table 3. Contents of sections (and topics) of the discipline "Mathematics"

Section	Name of sections	Topic #	Name of topics
Section I	Common mathematics	Topic 1.1	Sets
		Topic 1.2	Sequences
		Topic 1.3	Series
Section II	Algebra	Topic 2.1	System of equations
		Topic 2.2	Matrices
Section III	Mathematical analysis	Topic 3.1	Derived functions

		Topic 3.2	Integration
		Topic 3.3	Differential equations

Individual modules and module's units

1. Individual module. COMMON MATHEMATICS

- **1.1. Module unit. SETS.**
- **Course contents:** Set notation, empty set, subset, The Real Numbers, Universal set, complement, Relationship between sets: Union, Intersection. Venn diagrams
-
- **1.2. Module unit. SEQUENCES**
- **Course contents:** Description of sequences, Arithmetic sequence, Geometric sequence, Convergent and divergent sequence, Limits of Special Sequences
-
- **1.3. Module unit. SERIES**
- **Course contents:** Partial sum, Arithmetic series, Geometrics series, Sum of an infinite sequence
-

2. Individual module. ALGEBRA

- **2.1. Module unit. SYSTEM OF EQUATIONS**
- **Course contents:** Independent Equations, Dependent Equations, Inconsistent Equations, Addition method, Substitution method
-
- **2.2. Module unit. MATRICES**
- **Course contents:** Square matrix, diagonal matrix, identity matrix
- Matrix operations: Addition, Subtraction, multiplication by a number, Multiplication. The inverse matrix. Determinant. Singular matrix. Application of matrices to solving simultaneous equations.
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3. Individual module. MATHEMATICAL ANALYSIS

- **3.1. Module unit. DERIVED FUNCTION**
- **Course contents:** Definition of derivative as slope or the rate of change, Rules of differentiation, Derivatives of trigonometric functions, Derivatives of inverse trigonometric functions, Derivatives of logarithmic functions, Derivatives of exponential functions
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- **3.2. Module unit. INTEGRATION**
- **Course contents:** Definition of integral as area or inverse derivative, Methods of algebraic integration, Tables of integrals, Determination of areas by integration
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- **3.3. Module unit. DIFFERENTIAL EQUATIONS**
- **Course contents:** Solution of differential equations: By direct integration, By separating the variables

5.2. Discipline sections and type of activities

The curriculum of "General Medicine" provides the following types of classes for the discipline "Mathematics": seminar, individual work of students (Table 4).

Table 4. Discipline sections and types of classes of the “Mathematics”

№ п/п	Module	Lecture.	Practice Work	Lab Work	Seminar	IW	Total hours
1.1.	COMMON MATHEMATICS				8		8
1.2.	ALGEBRA				10	1	11
1.3.	MATHEMATICAL ANALYSIS				16	1	17
1.4.	In total				34	2	36

6. Laboratory workshop (not provided)

7. Practical workshop

The curriculum for the specialty "General Medicine" provides for the discipline "Mathematics" 2 hours of seminars per week (total 36 hours = 18 classes) (Table 5).

Table 5. Topics of practical classes laboratory works on “Mathematics”

№	Module	Topics of practical classes (seminars)	Total hours
•	Module 1	Sets	4
		Sequences	2
		Series	2
•	Module 2	System of equations	2
		Matrices	8
•	Module 3	Derived functions	6
		Integration	6
		Differential equations	4

8. Material and technical support of the discipline:

For classes, group and individual consultations, monitoring and intermediate certification, computer classes 426, 428, 429, 434, 448, 451, 452 and 453 are used located at the address: Moscow, st. Miklukho-Maklaya, 10, building 2. and a lecture hall located at the address: Moscow, st. Miklukho-Maclay, 8.

A set of workstations consisting of computer tables, chairs, marker board; technical means: interactive whiteboard, projection screen, multimedia projector, teacher's laptop, monoblocks.

Computing server HP ProLiant ML350 Gen 10, Monoblock Acer Aspire C24-865 - 16 pcs., Monoblock Lenovo V30a-24IML All-In-One 23.8 "- 19 pcs., Monoblock Acer Z3-615 - 12

pcs., Workplace as part of the Dell Optiplex 3010MT system unit and Dell S2240L monitor - 6 pcs., Gladius 210XT0808R-21064 server - 3 pcs.

9. Information support of the discipline

a) software:

- Microsoft Subscription Enrollment for Education Solutions (EES) No. 56278518 dated 04/23/2019 (renewed annually, the program is assigned a new number).

б) databases, reference and search systems:

1. EBS of RUDN University and third-party EBS to which students have access on the basis of concluded agreements:

- RUDN University Library System <http://lib.rudn.ru/MegaPro/Web>
- EBS "University Library Online" <http://www.biblioclub.ru>
- EBS "Yurayt" <http://www.biblio-online.ru>
- EBS "Student Consultant" www.studentlibrary.ru
- EBS "Lan" <http://e.lanbook.com/>
- TUIS: <http://esystem.rudn.ru/>
- All-Russian Institute for Scientific and Technical Information of the Russian Academy of Sciences (VINITI RAS) <http://www2.viniti.ru/>

2. Database of medical and biological publications:

- Yandex search engine <https://www.yandex.ru/>
- Google search engine <https://www.google.ru/>
- SCOPUS abstract database <http://www.elsevierscience.ru/products/scopus/>
- WHO Documentation Center <http://whodc.mednet.ru/>
- NCBI: <https://p.360pubmed.com/pubmed/>
- RUDN University Bulletin: access mode from the RUDN University territory and remotely <http://journals.rudn.ru/>
- Scientific library Elibrary.ru: access by IP-addresses of RUDN University at: <http://www.elibrary.ru/defaultx.asp>
- ScienceDirect (ESD), "FreedomCollection", "Cell Press" ID "Elsevier". There is remote access to the database, access by IP-addresses of RUDN University (or remotely by individual login and password).
- Google Academy (eng. Google Scholar) - a free search engine for full texts of scientific publications of all formats and disciplines. Indexes full texts of scientific publications. Access mode: <https://scholar.google.ru/>
- Scopus - scientometric database of the publishing house "Elsevier". There is remote access to the database.

Access by IP-addresses of RUDN University and remotely by login and password (Grant of the Ministry of Education and Science). Access mode: <http://www.scopus.com/>

- Web of Science. There is remote access to the database. Access to the platform is carried out by IP-addresses of the RUDN University or remotely. Remote access to WOS is activated without administrator intervention after registering on the platform from RUDN University <http://login.webofknowledge.com/>

10. Methodical support of discipline:

Main literature

- Luk'yanova E.A. Mathematics for medical students. M.: Publ. by PFUR.-2014

Textbooks

- Luk'yanova E.A. Mathematics for medical students. M.: Publ. by PFUR.-2014

11. Methodical instructions for students on mastering the discipline (module)

Practical workshops on the discipline "Mathematics" "are conducted by teachers of the Department of Medical Informatics and Telemedicine. The course includes practical workshops and students' selfwork. This discipline is a compulsory discipline for the direction of "General Medicine".

The teachers of the department recommended modern literature, and attention is paid to the fact that the recommended literature contains the latest changes and additions.

In classes the relevant topics are analyzed using multimedia technology (computer, projector). For each workshop, there are presentations prepared in Microsoft PowerPoint, containing from 10 to 30 slides. For each task, step-by-step instructions for their implementation are prepared. The main goal of classes is to form students' understanding and holistic perception of the basic concept of common mathematics, algebra and mathematical analysis.

Self-work of students during extracurricular hours can take place in the classrooms of the department and at home. The student's extracurricular independent work includes:

Study of material according to the textbook, teaching aids.

Independent study of data processing programs.

Work in the information and educational environment.

12. Fund of assessment tools for intermediate certification of students in the discipline

Materials for assessing the level of mastering the educational material of the discipline "Medical informatics" (evaluation materials), including a list of competencies with an indication of the stages of their formation, a description of indicators and criteria for evaluating competencies at various stages of their formation, a description of the assessment scales, typical control tasks or other materials necessary for assessing knowledge, skills, skills and (or) experience of activity, characterizing the stages of the formation of competencies in the process of mastering the educational program, methodological materials that determine the procedures for assessing knowledge, skills, skills and (or) experience of activities that characterize the stages of formation of competencies, developed in full and available for students on the discipline page at TUIS RUDN.

The program has been drawn up in accordance with the requirements of the ES HE RUDN.

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