Federal State Autonomous Educational Institution of Higher Education

PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA

NAMED AFTER PATRICE LUMUMBA

(RUDN University)

Institute of Medicine

COURSE SYLLABUS

MATHEMATICS

Recommended by the Didactic Council for the Education Field of:

31.05.01 General Medicine

The course instruction is implemented within the professional education programme of higher education:

General Medicine

2026г.

1. COURSE GOAL(s)

Course Goal: the goal is to get the students to know basic methods of mathematical analysis for solving the assigned tasks in medicine and health care.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) "Mathematics" is aimed at the development of the following competences: GC-1, GPC-10.

Table 2.1. List of competences that students acquire through the course study

Competence code	**Competence descriptor**	**Competence formation indicators** (within this course)
GC-1	Able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy	GC-1.1 Analyzes scientific and technical literature and regulatory documentation of medical organizations
		GC-1.2 Critically evaluates the reliability of information sources, works with conflicting information from different sources
GPC-10	Able to solve standard tasks of professional activity using information, bibliographic resources, biomedical terminology, information, and communication technologies, taking into account the basic requirements of information security	GPC -10.1 Be able to use modern information and communication tools and technologies in professional activities

3. COURSE IN THE HIGHER EDUCATION PROGRAMME STRUCTURE

The course refers to the core/variable/elective* component of (B1) block of the higher educational programme curriculum.

* - Underline whatever applicable.

Within the higher education programme students also master other (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the course study.

Table 3.1. The list of the higher education programme components/disciplines that contribute to the achievement of the expected learning outcomes as the course study results

Competence code	**Competence descriptor**	**Previous courses/modules***	**Subsequent courses/modules***
GPC-10	Able to solve standard tasks of professional activity using		Medical Informatics, Biochemistry, Pharmacology, General Surgery, Radiology, Medical Rehabilitation,

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
	information, bibliographic resources, biomedical terminology, information, and communication technologies, taking into account the basic requirements of information security		Professional Diseases, Anesthesiology, Resuscitation, Intensive Care, Biostatistics, Telemedicine, Medical Enzymology, Modern Methods of Medical Statistics
GC-1	Able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy		Philosophy, Anatomy, Psychology and Pedagogy, Biochemistry, Propaedeutics of Internal Diseases, Immunology, Public Health and Healthcare, Healthcare Economics, Epidemiology, Neurology, Medical Genetics, Neurosurgery, Faculty Therapy, Infectious Diseases, Hospital Therapy, Endocrinology, Anesthesiology, Resuscitation, Intensive Care, Allergology, Disaster Medicine, Phthisiology, Medical Enzymology

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the discipline " **Mathematics"** is equal to **2** credits (72 academic hours).

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*Table 4.1. Types of academic activities during the periods of higher education programme mastering (**full-time training**)**

Type of academic activities	Total academic hours	Semesters/training modules	
		1	
Classroom learning *, ac.h.*	**34**	**34**	
Lectures (LC)			
Lab work (LW)			
Seminars (workshops/tutorials) (S)	34	34	

Type of academic activities		Total academic hours	Semesters/training modules	
			1	
Self-studies, academic hours (SS)		**35**	**35**	
Evaluation and assessment (exam or pass/fail grading)		**3**	**3**	
Total workload of the discipline	ac.h.	**72**	**72**	
	credits	**2**	**2**	

5. THE COURSE MODULES AND CONTENTS

Table 5.1. Course Modules and Content ин by learning activities

Course module title	Course module contents (topics)	Academic activities types
Section 1 Common mathematics	1.1 Sets Set notation, empty set, subset, The Real Numbers, Universal set, complement, Relationship between sets: Union, Intersection. Venn diagrams	SM, SS
	1.2 Sequences Description of sequences, Arithmetic sequence, Geometric sequence, Convergent and divergent sequence, Limits of Special Sequences	SM, SS
	1.3 Series Partial sum, Arithmetic series, Geometrics series, Sum of an infinite sequence	SM, SS
Section 2 Algebra	2.1. System of equations Independent Equations, Dependent Equations, Inconsistent Equations, Addition method, Substitution method	SM, SS
	2.2. Matrices 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.	SM, SS
Section 3 Mathematical analysis	3.1 Derived function 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	SM, SS
	3.2 Integration Definition of integral as area or inverse derivative, Methods of algebraic integration, Tables of integrals, Determination of areas by integration	SM, SS
	3.3 Differential equations Solution of differential equations By direct integration By separating the variables	SM, SS

* - to be filled in only for **full** -time training: *LC - lectures; LW - lab work; S - seminars.*

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENT

Table 6.1. Classroom equipment and technology support requirements

Type of academic activities	**Classroom equipment**	**Specialised educational / laboratory equipment, software, and materials for course study** (if necessary)
Computer-Lab	Computer Lab Classroom can be used for seminars, lab works and consulting. Equipped with a set of specialized furniture, computers with access to electronic information and educational environment (EIEE)	Set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector Epson EB-965H, laptop, Monoblock Acer Aspire C24-865, projection screen, stable wireless Internet connection. Software: Microsoft Windows, MS Office / Office 365, MS Teams, Chrome (latest stable release)
Self-studies	Classroom for self-study (can be used for seminars and consulting. Equipped with a set of specialized furniture, computers with access to electronic information and educational environment (EIEE)	Set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector Epson EB-965H, laptop, Monoblock Acer Aspire C24-865, projection screen, stable wireless Internet connection. Software: Microsoft Windows, MS Office / Office 365, MS Teams, Chrome (latest stable release)

7. RECOMMENDED SOURSES for COURSE STUDIES

а) Main readings:

- Лукьянова Елена Анатольевна. Математика для студентов медицинских специальностей = Mathematics for medical students : учебно-методическое пособие / Е.А. Лукьянова. - Электронные текстовые данные. - М. : РУДН, 2014. - 21 с. : ил. URL: https://lib.rudn.ru/MegaPro/UserEntry?Action=Link_FindDoc&id=431272&idb=0

б) Additional (optional) readings:

- Course: Mathematics for medical students.

(http://esystem.pfur.ru/course/view.php?id=9025)

Internet-(based) sources:

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/

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/

Learning toolkits for self- studies located in RUDN LMS TUIS.

1. Learning toolkits for implementation of control work and self-study on «Mathematics»

8. EVALUATION TOOLKIT AND GRADE SYSTEM FOR ASSESSMENT

Assessment and evaluation toolkit (ET), marking/grading criteria (point-rating system (PRS)* of competences in the discipline « Mathematics » are presented in the Appendix to this course syllabus of the discipline.

* - ET and PRS are formed on the basis of the requirements of the relevant local regulatory act of the RUDN

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