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**Federal State Autonomous Educational Institution of Higher Education**  
**PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA**  
**RUDN University**  
**Institute of Medicine**

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educational division (faculty/institute/academy) as higher education programme developer

**COURSE SYLLABUS**

Microbiology, Virology

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course title

**Recommended by the Didactic Council for the Education Field of:**

31.05.01 General Medicine

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field of studies / speciality code and title

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

General Medicine

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higher education programme profile/specialisation title

2024

### 1. COURSE GOAL(s)

The goal of the course “Microbiology, Virology” is to equip students with knowledge of the pathogenic and opportunistic microorganisms, their systematics, biological properties, role in human pathology, theoretical bases of diagnostics of infectious diseases, principles of the prophylaxis and etiotropic treatment of the human infectious diseases.

### 2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) “Microbiology, Virology” is aimed at the development of the following competences /competences in part: **(GPC)-5**.

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

<b>Competence code</b>	<b>Competence descriptor</b>	<b>Competence formation indicators (within this course)</b>
GPC-5	Able to assess morpho-functional, physiological states and pathological processes in the human body to solve professional problems	GPC-5.1. Mastering the algorithm of clinical, laboratory and functional diagnosis when dealing with professional tasks.
		GPC-5.2. Being able to evaluate the results of clinical, laboratory and functional diagnosis when dealing with professional tasks.
		GPC-5.3. Being able to determine morpho-functional, physiological states and pathological processes of the human body.

### 3. COURSE IN 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*
<b>GPC-5</b>	Able to assess morphofunctional, physiological states and pathological processes in the human body to solve professional problems	Biology Histology, embryology, cytology Anatomy	Infectious diseases Phthisiatry Epidemiology Dermatovenereology

#### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course “Microbiology, Virology” is 8 credits (288 academic hours).

*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		
		4	5	
<i>Contact academic hours</i>	<i>180</i>	<i>90</i>	<i>90</i>	
including:				
Lectures (LC)	36	18	18	
Lab work (LW)	144	72	72	
Seminars (workshops/tutorials) (S)				
<i>Self-studies</i>	<i>108</i>	<i>54</i>	<i>54</i>	
<i>Evaluation and assessment (exam/passing/failing grade)</i>				
<b>Course workload</b>	academic hours_	288	144	144
	credits	8	4	4

#### 5. COURSE CONTENTS

*Table 5.1. Course contents and academic activities types*

Course module title	Course module contents (topics)	Academic activities types
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<b>Module 1</b> The subject and objectives of Microbiology and Virology, their importance in medical practice.	Microbe as a living system. Morphology and Structure of microorganisms. Principles of classification. Microscopic techniques.	<b>Lc, Lw</b>
<b>Module 2</b> Physiology of microorganisms.	Growth and reproduction. Aerobic and anaerobic bacteria. An enzymatic activity of the microorganisms.	<b>Lc, Lw</b>
<b>Module 3</b> Genetics of microorganisms	Types of variability, exchange of genetic information in microbes.	<b>Lc, Lw</b>
<b>Module 4</b> General Virology	The structure of viruses, the interaction of viruses with cells, their reproduction of viruses. Bacteriophages.	<b>Lc, Lw</b>
<b>Module 5</b> The relationship of microbial populations in the body.	Synergy and antagonism. Antibiotics. The main groups of antibiotics, the mechanism of their action. Antibiotic resistance and ways to overcome it.	<b>Lc, Lw</b>
<b>Module 6</b> The doctrine of infection.	Dynamics of the infectious process, types of infections.	<b>Lc, Lw</b>
<b>Module 7</b> Pathogenic and resident cocci.	Staphylococci, streptococci. Causative agents of gonorrhoea and meningococcal infection.	<b>Lc, Lw</b>
<b>Module 8</b> Causative agents of respiratory infections.	Causative agent of diphtheria. The causative agents of whooping cough and pertussis.	<b>Lc, Lw</b>
<b>Module 9</b> Pathogenic mycobacteria.	The causative agents of tuberculosis and leprosy.	<b>Lc, Lw</b>
<b>Module 10</b> Pathogenic and resident anaerobic bacteria.	Causative agents of gas gangrene, tetanus and botulism. Do not spore forming anaerobes that are involved in the pathology of the oral cavity.	<b>Lc, Lw</b>
<b>Module 11</b> The causative agents of zoonotic diseases	The causative agents of zoonotic diseases: plague, tularemia, anthrax and brucellosis.	<b>Lc, Lw</b>
<b>Module 12</b> The causative agents of intestinal infections.	Typhoid fever, dysentery, salmonellosis, cholera, escherichiosis. <i>Compylobacter</i> and <i>helicobacter</i> .	<b>Lc, Lw</b>
<b>Module 13</b> Agents of spirochetosis.	Syphilis. Borreliosis and Lyme diseases, Leptospirosis,	<b>Lc, Lw</b>

<b>Module 14</b> Pathogenic Rickettsia and chlamydia.	Causative Agents of epidemic typhoid fever, Q-fever and other rickettsioses. Causative agents of chlamydia.	<b>Lc, Lw</b>
	The causative agents of amoebiasis, balantidiasis, trypanosomiasis, leishmania and malaria	<b>Lc, Lw</b>
<b>Module 15</b> Protozoal infection	Classification of mycoses. Dermatomycosis. Candidiasis, pneumocytosis	<b>Lc, Lw</b>
	Polio, influenza, herpes, HIV and AIDS. Hepatitis. Viruses of hemorrhagic fevers	<b>Lc, Lw</b>
<b>Module 16</b> Mycotic infection	Causative Agents of epidemic typhoid fever, Q-fever and other rickettsioses. Causative agents of chlamydia.	<b>Lc, Lw</b>
<b>Module 17</b> Viral infections	The causative agents of amoebiasis, balantidiasis, trypanosomiasis, leishmania and malaria	<b>Lc, Lw</b>

## 6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

*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)
Lecture	A lecture hall for lecture-type classes, equipped with a set of specialised furniture; board (screen) and technical means of multimedia presentations.	
Lab work	A classroom for laboratory work, individual consultations, current and mid-term assessment; equipped with a set of specialised	Gas burners, chalk board; technical means: electric screen Baromet 3.4 244/96 8 152*203MW, Epson EB-X05 multimedia projector, HP 6715s TL-60 laptop, Biomed-5 microscopes, TSvL-160 dry-air laboratory thermostat, Indesit SD 167 refrigerator, AZ-01 anaerostat, PCYA-10

	furniture and machinery.	ovoscope, PVF-35/1NB vacuum filtration device. Items necessary for microbiological research: tools (bacteriological loops and tweezers), laboratory utensils, a set of dyes, nutrient media, cultures of microorganisms.
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## 7. RESOURCES RECOMMENDED FOR COURSE STUDY

### *Main readings:*

Medical microbiology. – Seventeenth Edition. London: Elsevier, 2007. – 738 p.

### *Additional readings:*

1. Levinson W. Review of Medical Microbiology and Immunology. 14th Edition. -McGraw-Hill Education, 2016. - 832 p.
2. Ermolaev A.V. Introduction into medical microbiology reff lecture. Tutorial 2013. -70 p.
3. Ermolaev A.V. Laboratory techniques of medial microbiology. Tutorial 2013. -70 p.

### *Internet (based) sources*

- 1. Electronic libraries with access for RUDN students:
  - Electronic library network of RUDN – ELN RUDN <http://lib.rudn.ru/MegaPro/Web>
  - ELN «University Library online» <http://www.biblioclub.ru>
  - ELN Urait <http://www.biblio-online.ru>
  - ELN «Student Advisor» [www.studentlibrary.ru](http://www.studentlibrary.ru)
  - ELN «Lan» <http://e.lanbook.com/>
- 2. Databases and search engines:
  - electronic fund of legal and regulatory and technical documentation <http://docs.cntd.ru/>
  - search system Yandex <https://www.yandex.ru/>
  - search system Google <https://www.google.ru/>
  - abstract database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

### *Training toolkit for self- studies to master the course \*:*

1. The set of lectures on the course “Microbiology, Virology”

\* The training toolkit for self- studies to master the course is placed on the course page in the university telecommunication training and information system under the set procedure.

## 8. ASSESSMENT TOOLKIT AND GRADING SYSTEM\* FOR EVALUATION OF STUDENTS’ COMPETENCES LEVEL UPON COURSE COMPLETION

The assessment toolkit and the grading system\* to evaluate the competences formation level (GPC-5.1., GPC-5.2., GPC-5.3) upon the course study completion are specified in the Appendix to the course syllabus.

\* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

**DEVELOPERS:**

Associate Professor of the  
Department of Microbiology Volina E.G and Virology

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position, department	signature	name and surname
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Associate Professor of the  
Department of Microbiology Ermolaev A.V. and Virology  
Ph.D in Biology

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position, department	signature	name and surname
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**HEAD OF EDUCATIONAL DEPARTMENT:**

Microbiology and Virology Podoprighora I.V.

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name of department	signature	name and surname
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**HEAD  
OF HIGHER EDUCATION PROGRAMME:**

First Deputy Director of MI  
Academic Affairs Iv.V.Radysh for

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position, department	signature	name and surname
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