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**Federal State Autonomous Educational Institution of Higher Education  
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA named after  
Patrice Lumumba  
RUDN University**

**Institute of Medicine**

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

## **COURSE SYLLABUS**

### **Microbiology, Virology - Oral Microbiology**

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course title

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

**31.05.03 Dentistry**

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field of studies / speciality code and title

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

**Dentistry**

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higher education programme profile/specialisation title

2023-2024

## 1. COURSE GOAL(s)

The goal of the course «**Microbiology, Virology - Oral Microbiology**» is to equip students with knowledge about the diversity of the world of microorganisms, their role in human pathology, the theoretical foundations of the diagnosis of infectious diseases, the principles of immunological research, about opportunistic infections of the oral cavity.

## 2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) «**Microbiology, Virology - Oral Microbiology**» is aimed at the development of the following competences /competences in part: GPC-9.

*Table 2.1. The list of competencies formed by students during the development of the discipline (results of the mastering of the discipline)*

<b>Competence code</b>	<b>Competence</b>	<b>Indicators of Competence Formation (within the framework of this discipline)</b>
GPC-9	Able to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional problems	GPC-9.1. Owns the algorithm of clinical, laboratory and functional diagnostics in solving professional tasks.
		GPC-9.2. Evaluates the results of clinical, laboratory and functional diagnostics in solving professional tasks.
		GPC-9.3. Determines morphofunctional 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-9</b>	Able to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional problems	Human Anatomy - Head and Neck Anatomy Histology, Embryology, Cytology - Oral Histology Normal physiology, physiology of the maxillofacial region	Pathological anatomy - Pathanatomy of the head and neck Pathophysiology - Pathophysiology of the head and neck Ophthalmology Forensic medicine Obstetrics Oral surgery Maxillofacial and gnatic surgery Diseases of the head and neck Pediatric dentistry Orthodontics and children's prosthetics Medical rehabilitation Implantology and reconstructive surgery of the oral cavity

\* To be filled in according to the competence matrix of the higher education programme.

#### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course is «**Microbiology, Virology - Oral Microbiology**» 6 credits (216 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	
		3	4
<i>Contact academic hours</i>	<b>123</b>	<b>51</b>	<b>72</b>
including:			
Lectures (LC)	<b>35</b>	<b>17</b>	<b>18</b>
Lab work (LW)	<b>88</b>	<b>34</b>	<b>54</b>
Seminars (workshops/tutorials) (S)	-	-	-
<i>Self-studies</i>	48	30	18
<i>Evaluation and assessment (exam/passing/failing grade)</i>	45	27	18
<b>Course workload</b>	academic hours	<b>216</b>	<b>108</b>
	credits	<b>6</b>	<b>3</b>

\* To be filled in regarding the higher education programme correspondence training mode.

## 5. COURSE CONTENTS

*Table 5.1. Course contents and academic activities types*

Type of academic activities	Total academic hours	Semesters/training modules
<b>Module 1</b> Morphology of microorganisms.	<b>1.1.</b> Microbe as a living system. Classification and nomenclature of microorganisms. Morphology and structure of bacteria, viruses, fungi and protozoa.	Lc, Lw
	<b>1.2.</b> Simple and complex methods of staining microbes. Microscopy methods.	Lw
<b>Module 2</b> Physiology of microorganisms.	<b>2.1.</b> Topic 2.1. Nutrient media. Methods of sterilization and disinfection. Methods of cultivation of aerobes. Isolation of pure aerobic cultures.	Lc, Lw
	<b>2.2.</b> Methods of identification of pure cultures of microbes. Study of the biochemical properties of microbes.	Lc, Lw
	<b>2.3.</b> Methods of cultivation of anaerobes. Isolation of pure anaerobic cultures and their identification	Lc, Lw
<b>Module 3</b> Genetics of microorganisms.	<b>3.1.</b> Genetic material of bacteria. Features of the structure and functioning. IS - elements. Transposons. Bacterial plasmids, their functions and properties. The use of plasmids in genetic engineering. Topic 3.2.	Lc
	<b>3.2.</b> Variability of microbes, its types and significance.	Lc, Lw
<b>Module 4</b> The relationship of microbial populations in the body.	<b>4.1.</b> Normal human microflora.	Lc, Lw
	<b>4.2.</b> The phenomenon of antagonism of microbes. Antibiotics. Classification, mechanism of action of antibacterial drugs. Complications of antibiotic therapy (dysbiosis, candidomycosis, etc.).	Lc, Lw
	<b>4.3.</b> Methods for determining the sensitivity of bacteria to antibiotics. Mechanisms of drug resistance of pathogens of infectious diseases. Ways to overcome drug resistance.	Lc, Lw
<b>Module 5</b> General virology.	<b>5.1.</b> Methods of virus cultivation. Types of interaction of the virus with the host cell. Phases of virus reproduction.	Lc, Lw
	<b>5.2.</b> Bacteriophages. Interaction of a phage with a bacterial cell. Moderate and virulent bacteriophages. Lysogeny. Detection. Practical application.	Lc, Lw

Type of academic activities	Total academic hours	Semesters/training modules
<b>Module 6</b> The doctrine of infection.	<b>6.1.</b> Experimental infection and bacteriological studies of animal corpses. Methods of laboratory diagnostics of infectious diseases.	Lc, Lw
<b>Module 7</b> Private bacteriology.	<b>7.1.</b> Pathogenic and resident cocci. Staphylococci, streptococci, neisseria. Laboratory diagnostics of coccal infections.	Lc, Lw
	<b>7.2.</b> Pathogens of airborne infections. The causative agent of diphtheria. Pathogens of whooping cough and paracoccussis. Pathogenic Mycobacteria. Pathogens of tuberculosis and leprosy.	Lc, Lw
	<b>7.3.</b> Pathogenic and resident anaerobic bacteria. Pathogens of gas gangrene, tetanus and botulism.	Lc, Lw
	<b>7.4.</b> Pathogens of zoonotic infections: anthrax and brucellosis.	Lc, Lw
	<b>7.5.</b> Pathogens of intestinal infections: typhoid fever, salmonellosis, dysentery, escherichiosis.	Lc, Lw
	<b>7.6.</b> Pathogenic spirochetes. The causative agent of syphilis. The manifestation of syphilis in the oral cavity. Fusospirochetosis.	Lc, Lw
	<b>7.7.</b> Pathogenic rickettsia and chlamydia. Pathogens of epidemic typhus, Pathogens of chlamydia.	Lc, Lw
<b>Module 8</b> Protozoal infections.	<b>8.1.</b> Sarcodes. Classification. The causative agent of amoebic dysentery. Characteristics of the pathogen. Pathogenesis. Epidemiology. Methods of laboratory diagnostics.	Lc, Lw
	<b>8.2.</b> Sporozoa. Pathogens of malaria. Morphology of pathogens. The cycle of development of malarial plasmodium in the human body and the mosquito. Clinical forms of the disease. Microbiological diagnostics. Chemotherapy. Malaria control measures.	Lc, Lw
<b>Module 9</b> Private Virology.	<b>9.1.</b> Herpes infection. Taxonomy and characteristics of pathogens. Herpetic stomatitis. Laboratory diagnostics. Methods of prevention.	Lc, Lw
	<b>9.2.</b> Pathogens of hepatitis (enteral and parenteral). Taxonomy. Characteristics of pathogens. Laboratory diagnostics. Prevention.	Lc, Lw

Type of academic activities	Total academic hours	Semesters/training modules
	<b>9.3.</b> Human immunodeficiency viruses. Taxonomy. Characteristics of pathogens. Laboratory diagnostics. Prevention.	Lc, Lw
<b>Module 10</b> Microbiology of the oral cavity.	<b>5.1.</b> Basic (Comparative) Embryology	Lc, Lw
	<b>10.1.</b> Normal microflora of the oral cavity. Nonspecific resistance of the oral cavity. Specific mechanisms of protection of oral mucosa.	Lc, Lw
	<b>10.2.</b> Opportunistic processes in the oral cavity. Candidiasis, recurrent aphthous stomatitis, glossitis, gingivitis.	Lc, Lw
	<b>10.3.</b> Microflora in odontogenic inflammation: pulpitis, periodontitis, abscess, phlegmon, osteomyelitis, sepsis.	Lc, Lw
	<b>10.4.</b> The role of oral microflora in the pathogenesis of caries and inflammatory processes in periodontal disease.	Lc, Lw
	<b>10.5.</b> Age-related changes in the microbial flora of the oral cavity.	
	<b>10.6.</b> The influence of prostheses, filling materials, medicines on the microbial flora of the oral cavity.	

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

## 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)
Lab work	Medical Biotechnologies Lab equipped with a set of specialized furniture and lab equipment; (classrooms 310, 311)	Classroom for lectures and seminars, group and individual consultations, ongoing monitoring and intermediate certification. A set of specialized furniture; technical means: a TOSHIBA X200 multimedia projector, an ASUS F9E Core 2 DUO T5750 laptop, Internet access is available. Software: Microsoft products

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
		(OS, office suite, including MS Office/ Office 365, Teams, Skype)
Lab work	Classroom for lab work, individual consultations, self-studies equipped with a set of specialized furniture; whiteboard; light microscopes and a set of devices (classrooms. 208, 210, 310, 311, 332).	The laboratory is equipped with specialized laboratory furniture; gas burners, chalkboard; technical means: electric screen Baronet 3.4 244/96 8 152* 203MW, Epson EB-X05 multimedia projector, HP 6715s TL-60 laptop, Biomed-5 and BiOptic microscopes, TSvL-160 dry-air laboratory thermostat, Indesit SD 167 refrigerator. Items necessary for microbiological research: instruments (bacteriological loops and tweezers), laboratory utensils, a set of dyes, nutrient media, cultures of microorganisms.
Self-studies	Classroom for self-studies of students (can be used for seminars and consultations), equipped with a set of specialized furniture, microscopes and computers with stable wireless Internet connection. (aud. 208, 210).	The laboratory is equipped with specialized laboratory furniture; chalkboard; microscopes "Biomed-5" and "BiOptic".

## 7. RESOURCES RECOMMENDED FOR COURSE STUDY

### *Main readings:*

1. Willey J., Sandman K., Wood D. Prescott's Microbiology (9th Edition): USA, McGraw Hill; 11th edition (January 2, 2019) - 1104 p.; ISBN-1260211886.
2. Michael J. Leboffe, Burton E. Pierce. Microbiology: Laboratory Theory & Application, Brief 3e (3rd Edition): USA, Morton Publishing Company; 3rd edition (January 1, 2016)- 656 p.; ISBN- 1617314773.

3. John W. Foster, Zarrintaj Aliabadi, Joan L. Slonczewski. Microbiology: The Human Experience Second Edition (July 1, 2021). USA, W. W. Norton & Company; 1072 p.; ISBN- 0393533247

*Additional readings:*

***Electronic full-text materials:***

1. Sarukhanova L.E., Volina E.G., Yashina N.V. General microbiology, virology and circadian immunology. Study guide. [Electronic resource]. M.: RUDN Publishing House, 2020.
2. Volina E.G., Sarukhanova L.E., Podoprighora I.V. Private microbiology. Study guide. [Electronic resource]. M.: RUDN Publishing House, 2020.
3. Zhigunova A.V., Podoprighora I.V. Diarrheogenic E. coli. Educational and methodical manual. [Electronic resource]. Moscow: RUDN Publishing House, 2019. - 25 p.
4. Sharova I.N., Yashina N.V., Smolyakova L.A., Podoprighora I.V., Mefed K.M., Kravtsov E.G. Human Herpesvirus diseases. Study guide. [Electronic resource]. - Moscow: RUDN Publishing House, 2018. - 145 p.
5. Volina E.G., Sarukhanova Ya.R., Sarukhanova L.E. Methods for determining the enzymatic activity of pathogens of infectious diseases. Educational and methodical manual. [Electronic resource]. Moscow: RUDN Publishing House, 2017. - 48 p.
6. Volina E.G., Sarukhanova L.E. Agglutination reaction and its variants in the diagnosis of infectious diseases. Educational and methodical manual. [Electronic resource]. Moscow: RUDN Publishing House, 2016. – 43 p.
7. Sarukhanova L.E., Volina E.G., Sarukhanova Ya.R. Complement system. Diagnostic tests involving complement. Educational and methodical manual. [Electronic resource]. Moscow: RUDN Publishing House, 2016. – 35 p.
8. Mansur T.I., Osipova I.G., Girich V.S., Vasilyeva E.A., Evlashkina V.F., Vasina T.A. Intestinal dysbiosis (dysbiosis) and tactics of its treatment in the practice of a family doctor. Educational and methodical manual. [Electronic resource]. M., RUDN, 2015.
9. Sarukhanova Ya.R., Volina E.G., Sarukhanova L.E. Diphtheria. Educational and methodical manual. [Electronic resource]. Moscow: RUDN Publishing House, 2018.

***Printed publications:***

1. Smolyakova L.A., Sharova I.N., Podoprighora I.V. Mechanisms of antibiotic resistance development in bacteria. Educational and methodical manual. - M.: Publishing House of RUDN, 2021. - 31 p.
2. Girich V.S., Yashina N.V., Podoprighora I.V., Zhigunova A.V., Ermolaev A.V. Salmonellosis. Pathogens of typhoparathyphoid infections and food toxicoinfections. Educational and methodical manual. M.: Publishing House of RUDN, 2021. - 39 p.



3. Levinson U. Medical microbiology and immunology. Translated from English. Edited by V.B. Beloborodov. – 3rd ed. M.: Laboratory of Knowledge, 2020. – 1181 p.
4. Kravtsova.G., Sharova I.N., Yashina N.V., Smolyakova L.A., Senyagin A.N., Podoprigora I.V. Microflora of the oral cavity. Educational and methodical manual. - M.: Publishing House of RUDN, 2018. - 32 p.
5. Ermolaev A.V., Yashina N.V., Anokhina I.V. Methods of modern serology. Educational and methodical manual. Moscow: Publishing House of RUDN, 2014.

#### *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 - Oral Microbiology**»
2. The laboratory workshop (if any).on the course «**Microbiology, Virology - Oral Microbiology**»
3. The guidelines for writing a course paper / project (if any) on the course «**Microbiology, Virology - Oral Microbiology**».
4. ....

\* 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-9) 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  
Microbiology Department by  
V.S. Kiktenko

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position, department

N.P. Sachivkina

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signature

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name and surname

**HEAD OF EDUCATIONAL  
DEPARTMENT:**  
Microbiology by V.S.  
Kiktenko

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name of department

I.V. Podoprighora

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**HEAD  
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First Deputy Director of MI  
for Academic Affairs

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S.N. Razumova

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name and surname