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Federal State Budget Educational Institution
of Higher Education
Pacific State Medical University
of the Ministry of Health of the Russian Federation

APPROVED BY

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_____ / Zaitseva E.A./
"1st" of April 2025

SUBJECT GUIDE FOR TEACHERS AND STUDENTS FOR

Б1.О.12 Microbiology, virology - Oral microbiology

(name of discipline)

Specialty	**31.05.03 Dentistry for international students (in English)** (code, name)
Degree	Specialist's degree
Profile	02 "Healthcare" (in the field of providing health care in patients with dental pathology)
Mode of study	Full-time
Period of mastering the BEP	**5 years** (nominal length of study)
Department	of Microbiology, Dermatovenereology and Cosmetology

Vladivostok, 2025

Subject guide for teachers and students for **Б1.О.12 Microbiology, virology - Oral microbiology** is based on:

1) Federal State Educational Standard of Higher Education for the specialty approved by the Order No. 984 of Ministry of Science and Higher Education of the Russian Federation dated August 12, 2020.

2) Curriculum for the 31.05.03 Dentistry for international students (in English), profile 02 "Healthcare" (in the field of providing health care in patients with dental pathology), approved by the Academic Council of FSBEI HE PSMU of the Ministry of Health of Russia Report No. 8/24-25 dated March 31, 2025.

Subject guide for teachers and students for **Б1.О.12 Microbiology, virology - Oral microbiology** was developed by the writing team of the Department of Microbiology, Dermatovenereology and Cosmetology of the FSBEI HE PSMU of the Ministry of Health of Russia, under the guidance of the head of the department Head of the Department of Microbiology and Virology, Doctor of Medical Sciences, Associate Professor Zaitseva E.A.

Developed by:

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1. GENERAL PROVISIONS

Subject guide for **Б1.О.12 Microbiology, virology - Oral microbiology** is a set of recommendations and explanations that facilitate to optimal organization of mastering this discipline.

Regular analysis of lecture materials and work with end-of-the-text questions are necessary for better understanding of the material and systematization of knowledge of **Б1.О.12 Microbiology, virology - Oral microbiology**. Particular attention should be paid to emerging questions, confusing terms, and conflicts of points of view during the independent review of the lecture material. If necessary, a student should contact the teacher for advice. Lecture material streamlines students' thinking, while practical classes provide deeper insight into the material of the discipline.

Special attention should be paid to the content of the main provisions and conclusions, explanation of phenomena and facts, and clarification of the practical application of theoretic aspects of topic when preparing for a practical class. During this process students should aim to understand and remember the main provisions of the material under consideration, examples provided, as well as understand the illustrative material.

Collections of assessment tools are used to organize independent study of topics of **Б1.О.12 Microbiology, virology - Oral microbiology**.

Independent work of students is facilitated by the following:

1. availability and accessibility of the necessary educational and reference material;
2. a system of regular quality control of completed independent work;
3. availability of teacher's advice.

Subject guides for self-study are presented as literary resources and an atlas of the microscope slides. Subject guides for independent work of students include a list of library resources of the educational institution and other materials accessible to students.

Independent work is a type of in-person extracurricular work of teachers and students of **Б1.О.12 Microbiology, virology - Oral microbiology**. Control of independent work is conducted by the leading teacher. Evaluation of independent work results is taken into account when conducting interim examination of students throughout the **Б1.О.12 Microbiology, virology - Oral microbiology** course.

Continuous assessment during **Б1.О.12 Microbiology, virology - Oral microbiology** course is implemented in order to check indicators of achieving competencies, to stimulate students' academic work, and improve methods of mastering new knowledge. Continuous assessment during **Б1.О.12 Microbiology, virology - Oral microbiology** course is conducted during the semester to assess all types and sections of the academic discipline that encompass the competencies developed by the discipline: classroom questioning, conducting discussions, working with tests, preparing reports. Continuous assessment of students' knowledge and results of their preparation for practical classes is conducted during every class session.

Interim assessment aims to determine the level of mastery of competency indicators. It is conducted in the exam format after the student has mastered all sections of **Б1.О.12 Microbiology, virology - Oral microbiology** and takes into account learning outcomes for all types of student work over the entire period of mastering **Б1.О.12 Microbiology, virology - Oral microbiology** course.

Time allotted for interim assessment is indicated in the schedule.

Assignments given during practical classes, as well as assignments aimed to prepare students for continuous and interim assessment, are included in the collection of assessment tools for **Б1.О.12 Microbiology, virology - Oral microbiology**. If necessary, students should contact the teacher for advice. It is necessary to thoroughly think over questions that need clarification before seeking teacher's advice.

2. SUBJECT GUIDES FOR LECTURE CLASSES

Table 1. Subject Guides for **Б1.О.12 Microbiology, virology - Oral microbiology** Lectures

Topic No.1 Main historical stages of development of microbiology. Principles of classification, morphology, and structure of microorganisms	
Duration of the lecture (in academic hours):	2
Purpose of the lecture: 1. tell students about historical stages of development of microbiology, contributions of Russian and other scientists to development of microbiology; 2. define key terms, examine taxonomic characteristic of microorganisms.	
Lecture plan, order of presentation of its sections: - Microbiology as a science: its subject - Historical stages of development of microbiology - Contributions of scientists to development of microbiology - Medical microbiology: objectives of medical microbiology - Diagnostic methods in microbiology. Taxonomy and system of the microorganisms - Classification and morphology of bacteria. Structure of main and temporary structures of bacteria. Principles of classification of oral microorganisms	
Recommended reading: Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru Микробиология, вирусология и иммунология полости рта / под ред. В.Н. Царева. - М.: ГЭОТАР-Медиа, 2013.-572, [4] с.	
Topic No.2 Morphology of microflora of main biotopes of the oral cavity: mucosae, back of the tongue, subgingival space, oral fluid, dental plaque, its biological characteristics and assessment	
Duration of the lecture (in academic hours):	2
Purpose of the lecture: 1. tell students about morphology of microflora of main biotopes of the oral cavity; aspects of the structure of the cell wall of mycoplasma, rickettsia, fungi; aspects of metabolism of mycoplasma, rickettsia, fungi, dental plaque; 2. define microbiological method (culturing); 3. examine culturing and microscopy methods.	
Lecture plan, order of presentation of its sections: - Morphology. Main forms of microflora of main biotopes of the oral cavity - General characteristic of obligately anaerobic, facultative anaerobic, and aerobic oral microflora - Microbiocenosis, biofilms	
Recommended reading: Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru Микробиология, вирусология и иммунология полости рта / под ред. В.Н. Царева. - М.: ГЭОТАР-Медиа, 2013.-572, [4] с.	

Topic No.3 Physiology of microorganisms: microbial nutrition in breathing normal and laboratory environment. Growth and multiplication of microorganisms

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about aspects of chemical structure of bacteria, substance transport, bacterial enzymes, classification of culture media based on their purpose and use;
2. define physiology of microorganisms, culture media (including chromogenic agar);
3. examine purposes and use of culture media.

Lecture plan, order of presentation of its sections:
- Chemical structure of microorganism cell
- Microbial nutrition
- Microbial enzymes
- Metabolism
- Culture media
- Microbial breathing
- Growth and multiplication of microorganisms

Recommended reading:
Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru
Микробиология, вирусология и иммунология полости рта / под ред. В.Н. Царева. - М.: ГЭОТАР-Медиа, 2013.-572, [4] с.

Topic No.4 Morphology and physiology of viruses. Bacteriophage and its application in medicine

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about structure and morphology of viruses; stages of interaction between viruses and cells of the microorganism; aspects of structure of simple and complex;
2. define virion, virus, bacteriophage, and prions;
3. examine the methods of typing and detection of viruses.

Lecture plan, order of presentation of its sections:
- Virion, virus – main concepts
- Structure of virion
- Aspects of lifecycle of a virus
- Bacteriophages
- Culturing and detection of viruses

Recommended reading:
Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru
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Topic No.5 Ecological microbiology. Physiological human microflora. Forms of relationships between microbes and other biological objects. Antimicrobial agents. Classification, mechanisms of action. Antimicrobial resistance

Duration of the lecture (in academic hours):	4

Purpose of the lecture:
1. tell students about forms of relationships between microbes, formation of human microbiota in norm and in pathology, antimicrobial agents, mechanisms of action of antimicrobial agents, and development of antimicrobial resistance;
2. define physiological human microflora, biofilm, antimicrobial susceptibility and resistance;
3. examine the methods of identification and assessment of antimicrobial susceptibility and resistance.

Lecture plan, order of presentation of its sections:
- Main concepts
- Forms of relationships between microbes and other biological objects. Biological role of physiological human microflora
- Biofilms. Formation of biofilms in bacteria
- Antimicrobial agents. Classification. Mechanism of action on the structure of the bacterial cell
- Development of antimicrobial resistance in bacteria
- Methods of identification and assessment of antimicrobial susceptibility and resistance

Recommended reading:
Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru
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Topic No.6 Infection and infection process. Pathogenicity and microbial persistence. Role of adhesion and coaggregation of bacteria in development of dental plaque. Microbial adhesion to dental fillings, reconstructive and orthopedic (prosthetic) materia

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about infection process, pathogenicity and virulence factors of microorganisms, toxins;
2. define infection and infection process, microbial persistence, adhesion;
3. examine the methods of identification and assessment of virulence of a microorganism

Lecture plan, order of presentation of its sections:
- Main concepts
- Stages of infection process
- Pathogenicity and main virulence factors of microorganisms
- Toxins. Methods of identification and assessment of virulence of a microorganism

Recommended reading:
Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru
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Topic No.7 Fundamentals of environmental sanitary microbiology. Sanitary-indicatory microorganisms

Duration of the lecture (in academic hours):	4
Purpose of the lecture: 1. tell students about environmental sanitary microbiology and its role in practice of a dentist, sanitary-indicatory microorganisms; 2. define environmental sanitary microbiology as a science, sanitary-indicatory microorganisms; 3. examine the methods used in environmental sanitary microbiology.	
Lecture plan, order of presentation of its sections: - Objects of examination in environmental sanitary microbiology - Methods used in environmental sanitary microbiology - Sanitary-indicatory microorganisms. Standards - General characteristics of sanitary-indicatory microorganisms	
Recommended reading: Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru Микробиология, вирусология и иммунология полости рта / под ред. В.Н. Царева. - М.: ГЭОТАР-Медиа, 2013.-572, [4] с.	
Topic No.8 Microbiology of anaerobic wound infections: gas gangrene, tetanus. Clostridium tetani and Clostridium perfringens as causative agents of wound infections of maxillofacial region	
Duration of the lecture (in academic hours):	2
Purpose of the lecture: 1. tell students about anaerobic wound infections; 2. define anaerobic infections; 3. examine the microbiological methods of diagnosing anaerobic infections	
Lecture plan, order of presentation of its sections: - Taxonomy - Characteristics and biological features of pathogens, aspects of laboratory diagnostics	
Recommended reading: Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru Микробиология, вирусология и иммунология полости рта / под ред. В.Н. Царева. - М.: ГЭОТАР-Медиа, 2013.-572, [4] с.	

3. SUBJECT GUIDES FOR PRACTICAL CLASSES

Table 2. Subject Guides for Practical **Б1.О.12 Microbiology, virology - Oral microbiology** Classes

Topic No.1 Organization and working regime of general- and single-purpose microbiology laboratories	
Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate knowledge acquired during lectures;
2. during the discussion, outline the main requirement and working regime of general- and single-purpose microbiology laboratories;
3. thoroughly go over definitions and concepts of morphology, tinctorial properties, and structure of microorganisms;
4. study microscopy method;
5. develop an understanding of the algorithm of simple and complex staining methods.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, classroom questioning, tests

Recommended reading:
Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru
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Topic No.2 Physiology of microorganisms. Microbial nutrition in laboratory environment: culture media. Sterilization. Quality control

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate knowledge acquired during lectures;
2. during the discussion, outline the main aspects of metabolism in bacteria, classification of bacteria based on type of acquiring nutrition and energy;
3. thoroughly go over definitions and concepts of culturing microorganisms in laboratory environment;
4. study patterns of bacterial growth on culture media;
5. develop an understanding of aseptics and antiseptics, culture media sterilization.

Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.

Independent work of the student: Preparation of a report on the lecture. Working with study materials.

Methods of evaluation of acquired knowledge and skills: review of reports, discussions, classroom questioning, tests

Recommended reading:
Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru
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Topic No.3 Viruses: morphology and physiology. Methods of culturing and principles of identification of viruses. Viruses of the bacteria: bacteriophages	
Duration of the practical class (in academic hours):	4
Purpose of the practical class: 1. consolidate knowledge acquired during lectures; 2. during the discussion, outline classification, morphology, structure of a virion of simple and complex viruses; 3. thoroughly go over definitions and concepts of stages of reproduction of a virus, aspects of biosynthesis in the cells of the macroorganism, strategies of viral genome; 4. study methods of culturing and identifying viruses; 5. develop an understanding of biological properties of viruses that are pathogenic to humans and viruses of the bacteria (bacteriophages), their significance for science and medical practice.	
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, laboratory equipment, and subject guides for the discipline.	
Independent work of the student: Preparation of a report on the lecture. Working with study materials.	
Methods of evaluation of acquired knowledge and skills: review of reports, discussions, classroom questioning, tests	
Recommended reading: Микробиология, вирусология, иммунология полости рта : учебник [Электронный ресурс] / под ред. В. Н. Царева. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2021. - 720 с. URL: http://studentlibrary.ru Микробиология, вирусология и иммунология полости рта / под ред. В.Н. Царева. - М.: ГЭОТАР-Медиа, 2013.-572, [4] с.	

4. GUIDELINES FOR CONTINUOUS AND INTERIM ASSESSMENT

Table 3. Guidelines for Conducting Continuous and Interim Assessment during **Б1.О.12 Microbiology, virology - Oral microbiology** Course

Type of assessment	Assessment format (при необходимости убрать/добавить свое)
Continuous assessment	- conducting and evaluating oral or written quizzes during lectures and practical classes; - assessment and evaluation of completion and results of assignments given during practical classes; - assess and evaluate completion and results of individual assignments and exam tasks given during practical classes; - assessment and evaluation of lecture notes quality.
Interim certification	is conducted in written pass/fail test format; it allows to assess the development of students' competencies correlating with types of professional activity.

5 ASPECTS OF THE IMPLEMENTATION OF THE COURSE FOR STUDENTS WITH DISABILITIES AND SPECIAL NEEDS

5.1. Availability of accessible environment

For students with disabilities and special needs, if a written application is submitted, lectures and practical classes are carried out taking into account health limitations, individual capabilities and medical status (hereinafter referred to as individual characteristics) of the student. Compliance with the following general requirements is ensured: teaching aids for collective and individual use are provided, required technical assistance is provided by an assistant, buildings and premises where lectures and practical classes are taking place meet accessibility requirements, other arrangements lack of which makes it impossible or difficult to master the discipline are made.

5.2. Compliance with general requirements

When lectures and practical classes are carried out at the written application of the student, the following general requirements are met: lectures and practical classes for students with disabilities and special needs take place at the same location as for students who do not have disabilities, if this does not cause difficulties for students; an assistant (assistants), who provide(s) students with the necessary technical assistance taking into account individual characteristics of the student, is (are) provided; necessary teaching aids are provided, taking into account individual characteristics of the student.

5.3. Availability of the internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia to students with disabilities in a form accessible to them.

All internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia concerning the discipline (module) are made available to students with disabilities in a form accessible to them.

5.4. Increase in the duration of interim assessment of students with disabilities and special needs in relation to the established duration

Format of the interim assessment of academic performance within the scope of the discipline for students with disabilities and special needs is selected taking into account individual characteristics (orally, by writing on paper, by typing on a computer, as a test, etc.). The duration of the interim assessment in relation to the established duration is increased at the written application of the student with disabilities. Time limit for the student's preparation for the test is increased by at least 0.5 hours

6. STAFFING REQUIREMENTS OF THE DISCIPLINE

Academic teaching personnel that ensure the implementation of the discipline education process meet the requirements of the Federal State Educational Standard of Higher Education for the 31.05.03 Dentistry for international students (in English) specialty; list of the aforementioned personnel is available on the website of the educational organization.

