Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Стегний Кирилл Владимирович
Должность: И.о. ректора
Дата подписания: 15.04.2026 12:11:59
Уникальный программный ключ:
d59234ba928aea5c04c54eb9013e367220b6b2ae

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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Microbiology, Dermatovenereology
and Cosmetology
_____ / Zaitseva E.A./
"1st" of April 2025

COLLECTION OF ASSESSMENT TOOLS
Б1.О.12 Microbiology, virology
of the basic educational program
of Higher Education

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)
Institute/Department	of Microbiology, Dermatovenereology and Cosmetology

Vladivostok, 2025

1. INTRODUCTION

1.1. Collection of Assessment Tools is a document that regulates the format, content, and types of assessment tools for continuous assessment, interim examination and final (state final) examination, and graded criteria for each type of assessment tools.

1.2. Assessment tools allows to evaluate the development of universal, general professional, and professional competencies (UCs, GPCs and PCs respectively) outlined in Federal State Educational Standard of Higher Education and defined in the basic educational program of higher education for the specialty 31.05.03 Dentistry for international students (in English), profile 02 "Healthcare" (in the field of providing health care in patients with dental pathology).

(BEP HE for the 31.05.03 Dentistry for international students (in English) specialty, section 3 Learning Outcomes Requirements of the Basic Educational Program of Higher Education)

2. DOCUMENT BODY

2.1. Types of Assessment, Formats of Assessment Tools

No.	Types of assessment	Assessment Tools Format
1	**Continuous assessment**	**Tests**
		Interview Questions
2	**Interim assessment**	**Interview Questions**
		Case Studies

3. The contents of assessment tools for continuous and interim examination are prepared by the teacher of the course

Tests for continuous and interim assessment

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.03	Dentistry for international students (in English)
C	GPC-9	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Examination of the patient in order to make a diagnosis
	A/02.7	Prescribing pharmacological and non-pharmacological treatment and monitoring its efficiency and safety
I		**ANSWER LEVEL 1 TEST QUESTIONS (ONE CORRECT ANSWER)**
		1. Cellular forms of microorganisms do not include +1. viruses 2. bacteria 3. protozoa 4. fungi **2. The shapes of bacteria include spherical, rod-shaped, spiral/twisted, and branching. Bacteria that have a spiral/twisted shape are called** 1. cocci

		+2. spirochetes 3. actinomycetes 4. rods **3. Bacteria, in terms of their biological properties, belong to** 1. eukaryotes +2. prokaryotes 3. viruses 4. protozoa **4. The following type of bacteria proliferate in the +20°C - 42°C temperature range** +1. mesophiles 2. thermophiles 3. psychrophiles 4. acidophiles **5. To isolate a pure culture and identify it, _____ is used** +1. bacteriological method 2. bioassay 3. microscopy 4. serological method **6. Antibiotics isolated from fungi include** 1. tetracycline 2. polymyxin +3. penicillin 4. gramicidin **7. The combined use of penicillins, clavulanic acid or sulfobactam has the purpose of** 1. increase in antibiotic solubility 2. increase in intracellular antibiotic concentration 3. increase in the half-life of the antibiotic +4. blockade of beta-lactamases of the microorganism **8. The main mechanism of action of β-lactam antibiotics can be summed up as** +1. suppression of cell wall synthesis 2. impairement of protein synthesis 3. impairement of DNA synthesis 4. impairement of ribosomal function
I		**ANSWER LEVEL 2 TEST QUESTIONS (MULTIPLE CORRECT ANSWERS)**
		1. Organelles and substrates that are involved in the respiration of bacteria include 1. cell wall +2. cytoplasmic membrane +3. enzymes 4. ribosomes **2. Inhibitors of bacterial cell wall synthesis include such groups of antibiotics as**

		+1. penicillins +2. cephalosporins 3. rifampicins 4. polymyxins **3. Drug resistance of microorganisms is determined by** +1. the presence of drug resistance plasmids +2. a decrease in the number, or the absence of receptors on the cell surface that facilitate the interaction between the drug and the microbe +3. induced by the use of antimicrobials, selection of resistant strains, with the removal of susceptible +4. spontaneous mutations of the bacterial and/or host genome

Assessment criteria
"Very good" – over 80% correct answers of questions of every level
"Good" – 70-80% correct answers of questions of every level
"Satisfactory" – 55-69% correct answers of questions of every level
"Unsatisfactory" – less than 55% correct answers of questions of every level

Interview Questions for practical classes

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.03	Dentistry for international students (in English)
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F	A/01.7	Examination of the patient in order to make a diagnosis
	A/02.7	Prescribing pharmacological and non-pharmacological treatment and monitoring its efficiency and safety
I		**ANSWER THE QUESTIONS** ***Topic 5. Microbiological method. Cultivation of fungi, protozoa, rickettsia, chlamydia.*** 1. Aspects of cultivation of spirochetes (nutrient media, temperature optimum, growth energy, indication). 2. Cultivation of mycoplasmas, chlamydia, rickettsia (basic principles). 3. Cultivation of fungi (media, temperature regime, indication). 4. Cultivation of protozoa (general principles). ***Topic 7. Microbial ecology. Genetics and variability of microorganisms. Antibiotics: characteristics, classification, mechanisms of action. Determination of the sensitivity of microbes to antimicrobial agents.*** 1. Forms of relationship between microorganisms (metabiosis, symbiosis, neutralism, etc.). Biofilms. 2. Diagram of the genetic apparatus of bacteria (prokaryotes) and eukaryotes. Plasmids, nucleoid, nucleus. 3. Plasmids (of fertility, bacteriocinogeny, hemolyticity, etc.). 4. R and S forms of bacterial colonies. Application of bacterial

		variability in medical practice. 5. The concept and basic principles of chemotherapy and chemoprophylaxis. 6. Factors affecting the effectiveness of antimicrobial therapy: 7. Bacteriostatic and bactericidal activity of antimicrobial agents. 8. Classification of antibacterial agents 9. Antifungal, antiprotozoal, antiviral drugs. 10. The main mechanisms of action of antimicrobial agents. 11. Mechanisms of drug resistance formation. 12. Methods for determining the sensitivity of microbes to antimicrobial agents.

Interim assessment interview questions

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.03	Dentistry for international students (in English)
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F	A/01.7	Examination of the patient in order to make a diagnosis
	A/02.7	Prescribing pharmacological and non-pharmacological treatment and monitoring its efficiency and safety
I		**ANSWER THE QUESTIONS** **Section 1 - General Microbiology** 1. The main historical stages of the development of microbiology, the contribution of Russian and foreign scientists. Sections of Microbiology. 2. Basic principles of virus classification. 3. Basic principles of classification of microbes. 4. Morphology and basic structural elements of bacteria (permanent and temporary), functional significance. 5. Structure of the virion, forms of interaction with the eukaryotic cell. 6. Morphology of the microbiota of the main oral biotopes: mucous membrane, back of the tongue, gingival crest, oral fluid, dental plaque. 7. Normal oral microbiota. Morphology and structure of residents of the oral cavity: spirochetes, fungi, protozoa, mycoplasmas, and chlamydias. Methods of their detection. 8. Stabilizing and aggressive oral microbiota. Characteristics of the main oral biotopes. Dynamics of oral microbiocenosis formation. Age-related changes in the microbiota. 9. The role of adhesion and coaggregation of microbes in the mechanisms of plaque formation. The role of glycan biosynthesis. Adhesion of microbes to filling, reconstructive, and orthopedic materials. Physiology of microbes. Nutrition and its provision in laboratory conditions: culture media. 11. Respiration of microbes, its variants, provision in laboratory conditions.

		12. Principles and procedure of cultivation of aerobic microorganisms in laboratory conditions, their identification, typing, principles of presenting arguments for the conclusion. 13. Principles and procedure of cultivation of anaerobic microorganisms in laboratory conditions, their identification, typing, principles of presenting arguments for the conclusion. 14. Fungi, classification, main structural components, methods of indication. 15. Pathogenic protozoa, classification, biological properties, and methods of indication. 16. Chlamydias, morphophysiological properties, methods of detection. 17. Mycoplasmas, morphology, structure, physiological features, methods of detection. 18. Biochemical activity of microorganisms, its detection and differential diagnostic value. 19. The concept of pathogenicity of microorganisms (factors, methods of determination). 20. Viruses of the bacteria – bacteriophages, their biological characteristics, scientific and practical significance and use. 21. Antimicrobial agents, classification, mechanism of action on a microbial cell. 22. Antimicrobial resistance of microorganisms, mechanisms of its formation. 23. Infection and infectious process. Microbiological aspects of the pathogen detection at different periods of the infectious process. 24. Cariogenic species of microbes, their antagonists (Veillonella). The importance of the processes of glycolysis and phosphorylation and demineralization of enamel. 25. Cariogram, periodontopathogenic species of microbes: prevotella, porphyromonas, treponemas, actinobacilli. **Section 2 - Special (specialized) Microbiology** 1.Staphylococci. Properties of the pathogen. Methods of microbiological diagnostics. 2. Pathogenic clostridia and the causative agent of wound anaerobiosis – tetanus. Properties of the pathogen. Methods of microbiological diagnostics. 3. Pathogenic clostridia and causative agents of wound anaerobiosis – gas gangrene. Properties of pathogens. Methods of microbiological diagnostics. 4. Pathogenic mycobacteria – causative agents of tuberculosis. Properties of the pathogen. Methods of microbiological diagnostics. 5. Corynebacteria and diphtheria pathogens. Properties of the pathogen. Methods of microbiological diagnostics. 6. Pathogenic spirochetes, syphilis. Properties of the pathogen. Methods of microbiological diagnostics. 7. Herpesviridae. Properties of the pathogen. Methods of microbiological diagnostics. 8. Coronaviridae. SARS. Properties of the pathogen. Methods of microbiological diagnostics. 9. Orthomyxoviridae. The Influenza virus Properties of the

		pathogen. Methods of microbiological diagnostics. 10. Paramyxoviridae. Measles and its pathogen (causative agent). Properties of the pathogen. Methods of microbiological diagnostics. 11. Retroviruses. HIV infection and its causative agents. Properties of the pathogen. Methods of microbiological diagnostics. 12. Hospital-acquired (nosocomial) infections and their pathogens. Methods of microbiological diagnostics. 13. Cariogenic streptococci. Characteristics of *S. mutans*. Associative (auxiliary) microorganisms. 14. The role of microorganisms in the development of gingivitis, periodontitis, pulpitis, acute and chronic periodontitis, periostitis, osteomyelitis, abscesses and phlegmon of soft tissues. 15. Stomatitis caused by obligatory pathogenic and opportunistic bacteria. Fusospirochetosis. Characteristics of pathogens. 16. Viral stomatitis. 17. Candida. Candidal stomatitis, methods of microbiological diagnosis. 18. Foodborne toxicoinfections, pathogens and their properties. Methods of microbiological diagnostics. 19. Food intoxications (staphylococcal infection, botulism, etc.). Properties of pathogens. Methods of microbiological diagnostics. 20. Cholera and cholera vibrios. Properties of the pathogen. Methods of microbiological diagnostics. 21. Medical mycology: actinomycosis, candidomycosis, fusospirochetosis. The role of fungi in the ondotogenic infection of the maxillofacial region. 22. Medical mycology. Mycoses of the oral cavity. Diagnosing mycoses. 23. Dental caries. The role of microorganisms in the formation of dental plaque, caries. Diseases of the oral mucosa of microbial etiology. 24. Microbiology of pyogenic infections - streptococcosis. Scarlet fever, odontogenic diseases: caries, periodontitis, periodontal disease, pulpitis, stomatitis, sepsis. Pathogens, their classification, general and specific biological properties. 25. The role of actinomycetes in the development of gingivitis and periodontitis. Pathogens, their classification, general and special biological properties, principles and methods of microbiological diagnostics. **Section 3 – Case studies** 1. The laboratory received sputum from a patient with a pathological process in the lungs. Present an algorithm for microbiological examination of the biomaterial. 2. In the hospital, intestinal dysfunction was found in a child diagnosed with acute bronchial pneumonia. How to identify the etiology of diarrhea? 3. A patient who has been admitted to a hospital with a diagnosis of "food poisoning" is experiencing rapidly

		worsening dehydration. How (using what methods) can the etiology of the disease be identified? Present an algorithm for microbiological examination of the biomaterial. 4. During a remission in a child who has had chronic pneumonia and received antibiotic therapy, the temperature rose sharply, the mucous membrane of the mouth was covered with a gray-white coating. How to identify the etiology of this disease? 5. A patient with an injury to the right lower leg was admitted to the surgical department. The soft tissues of the lower leg have been crushed and are contaminated with soil. Present an algorithm for microbiological examination of the biomaterial. 6. A patient with botulism symptoms was admitted to the hospital. Emetic masses, remaining canned food (suspected source of infection) were delivered to the laboratory. Compile an algorithm for microbiological examination of the material. 7. A child diagnosed with Acute respiratory disease was admitted to the hospital. What microbiological methods can be used to clarify the etiology of the disease? 8. A child with "Diphtheria (?)" diagnosis was admitted to a children's infectious diseases hospital. Compile an algorithm for microbiological examination of the biomaterial to clarify the etiology of the disease. 9. A 4-year-old child with 38.6^{o}C fever and dyspeptic symptoms was admitted to the hospital. Preliminary diagnosis - Enteritis. The child was in contact with a polio (poliomyelitis) patient. Compile an algorithm for microbiological examination of the biomaterial to clarify the etiology of the disease. 10. Severe inflammation with swelling and tenderness was noted around the patient's affected tooth. Outline a plan of microbiological examination methods. 11. The laboratory received the sputum of a patient with a pathological process in the lungs. Outline a plan of microbiological examination methods. 12. A pure culture of *Staphylococcus aureus* was isolated from the nasopharyngeal lavage. Can it always be considered the cause of the disease? What microbiological methods can be used to prove that the detected strain is the causative agent of the disease? 13. Staphylococcus culture was isolated from two people. One of them had pyoderma, the other was healthy. How to prove that an isolated staphylococcus strain is involved in the development of the disease? 14. A child diagnosed with diphtheria was admitted to a children's infectious diseases hospital. How to clarify the etiology of the disease? 15. 150 mt/m^3 of *Staphylococcus aureus*, 10 mt/m^3 of tuberculosis bacilli, and 2700 mt/m^3 of saprophytic staphylococcus were found in the air of the dental office. Assess the air environment and give recommendations for its further use. 16. A person who had been using antimicrobials for a long time developed white plaques on the mucous membrane of the

		oral cavity. What is the possible cause of this disease? What microbiological tests can confirm the diagnosis? 17. In the autumn-winter period, an outbreak of acute respiratory diseases began and affected several hundred people living in different parts of the city and working at different facilities. What microbiological methods can be used to clarify the etiology of the disease? What microbiological research methods are used to study the following biological materials: 1) blood; 2) pus; 3) wound content; 4) CSF; 5) feces; 6) urine; 7) scraping (smear) from mucous membranes? 18. The patient presents with swelling and tenderness in the gum area that appeared in the evening after the morning tooth extraction surgery. What material should be taken for bacteriological research and how to properly collect biomaterial? What method is used to isolate the pathogen? 19. Patients in the postoperative ward of the Department of Maxillofacial Surgery developed abscesses of their wounds. What material is subject to microbiological testing? What can serve as evidence of a single source of these complications?

Standardized case studies and checklists for **Б1.О.12 Microbiology, virology** course

Case Study No. 1

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.03	Dentistry for international students (in English)
C	GPC-9	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Examination of the patient in order to make a diagnosis
	A/02.7	Prescribing pharmacological and non-pharmacological treatment and monitoring its efficiency and safety
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** A person who had been using antimicrobials for a long time developed white plaques on the mucous membrane of the oral cavity. What is the possible cause of this disease? What microbiological tests can confirm the diagnosis?
Q	1	Question: What complication took place?
Q	2	Question: What are its risk factors?
Q	3	Question: How to identify the etiology of this disease? Argument your answer.
Q	4	Question: What biomaterial needs to be collected and examined? What transport swabs need to be used?
Q	5	Question: What is the timeframe that the biomaterial for research should be delivered to the microbiological laboratory?

Case Study No.1 Checklist

	Code	Competence description / name of labor function / name of work activity / text
S	31.05.03	Dentistry for international students (in English)
C	GPC-9	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Examination of the patient in order to make a diagnosis
	A/02.7	Prescribing pharmacological and non-pharmacological treatment and monitoring its efficiency and safety
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** A person who had been using antimicrobials for a long time developed white plaques on the mucous membrane of the oral cavity. What is the possible cause of this disease? What microbiological tests can confirm the diagnosis?
Q	1	Question: What complication took place?
A		Development of candidiasis after antibiotic therapy.
Q	2	Question: What are its risk factors?
A		The main risk factors for this complication are long-term use of antibiotic therapy and a history of infectious disease.
Q	3	Question: How to identify the etiology of this disease? Argument your answer.
A		A microbiological examination is necessary to identify the cause of the complication.
Q	4	Question: What biomaterial needs to be collected and examined? What transport swabs need to be used?
A		Scraping/smear from the oral mucosa at the border of the healthy and affected parts must be used as biological material for examination. The biomaterial can be collected in a transport swab designed to test the material for fungi or in a sterile swab with a probe.
Q	5	Question: What is the timeframe that the biomaterial for research should be delivered to the microbiological laboratory?
A		When collecting biomaterial into the transport swab, it must be delivered to the laboratory within 24-48 hours at room temperature. When collecting the material with a sterile swab, it must be immediately delivered to the laboratory for testing (within 20 minutes).
R2	Very good	given to a student who gives a full correct answer, demonstrates deep, systemic knowledge of the subject, shows mastery of skills necessary to achieve objectives during professional activity, and knows and uses professional terminology correctly

R1	Good	given to a student who gives a full correct answer, demonstrates sufficient knowledge of the subject, shows mastery of skills necessary to achieve objectives during professional activity, knows and uses professional terminology, but whose answer was slightly inaccurate without being incorrect
	Satisfactory	given to a student who demonstrates sufficient base knowledge of the subject, shows mastery of professional skills, but whose answer was incorrect or had mistakes
R0	Fail	given to a student who has many fundamental mistakes

Case Study No. 2

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.03	Dentistry for international students (in English)
C	GPC-9	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity
F	A/01.7	Examination of the patient in order to make a diagnosis
	A/02.7	Prescribing pharmacological and non-pharmacological treatment and monitoring its efficiency and safety
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** The patient presents with swelling and tenderness in the gum area that appeared in the evening after the morning tooth extraction surgery. What material should be taken for bacteriological research and how to properly collect biomaterial? What method is used to isolate the pathogen?
Q		Question: What complication took place?
Q		Question: What are its risk factors?
Q		Question: How to identify the etiology of this disease? Argument your answer.
Q		Question: What biomaterial needs to be collected and examined? What transport swabs need to be used?
Q		Question: What is the timeframe that the biomaterial for research should be delivered to the microbiological laboratory?

Case Study No.2 Checklist

	Code	**Competence description / name of labor function / name of work activity / text**
S	31.05.03	Dentistry for international students (in English)
C	GPC-9	Is able to assess morphofunctional status, physiological states, and pathological processes in the human body when working to achieve objectives of professional activity

F	A/01.7	Examination of the patient in order to make a diagnosis
	A/02.7	Prescribing pharmacological and non-pharmacological treatment and monitoring its efficiency and safety
I		**READ THE PROVIDED CASE DESCRIPTION AND GIVE DETAILED ANSWERS TO THE QUESTIONS** The patient presents with swelling and tenderness in the gum area that appeared in the evening after the morning tooth extraction surgery. What material should be taken for bacteriological research and how to properly collect biomaterial? What method is used to isolate the pathogen?
Q	1	Question: What complication took place?
A		Correct answer: Development of gingivitis, alveolitis, periostitis during an infectious disease.
Q	2	Question: What are its risk factors?
A		Correct answer: The main risk factors for this complication are a decrease in immunity and a post-traumatic state after tooth extraction.
Q	3	Question: How to identify the etiology of this disease? Argument your answer.
A		Correct answer: A microbiological examination is necessary to identify the cause of the complication.
Q	4	Question: What biomaterial needs to be collected and examined? What transport swabs need to be used?
A		Correct answer: Scraping/smear from the oral mucosa at the border of the healthy and affected parts must be used as biological material for examination. The biomaterial can be collected in a transport swab designed to test the material for fungi or in a sterile swab with a probe.
Q	5	Question: What is the timeframe that the biomaterial for research should be delivered to the microbiological laboratory?
A		Correct answer: When collecting biomaterial into the transport swab, it must be delivered to the laboratory within 24-48 hours at room temperature. When collecting the material with a sterile swab, it must be immediately delivered to the laboratory for testing (within 20 minutes).
R2	Very good	given to a student who gives a full correct answer, demonstrates deep, systemic knowledge of the subject, shows mastery of skills necessary to achieve objectives during professional activity, and knows and uses professional terminology correctly
R1	Good	given to a student who gives a full correct answer, demonstrates sufficient knowledge of the subject, shows mastery of skills necessary to achieve objectives during professional activity, knows and uses professional terminology,

		but whose answer was slightly inaccurate without being incorrect
	Satisfactory	given to a student who demonstrates sufficient base knowledge of the subject, shows mastery of professional skills, but whose answer was incorrect or had mistakes
R0	Fail	given to a student who has many fundamental mistakes

4. Assessment criteria for learning outcomes

"Very good" grade is given to a student who possesses knowledge of the subject in full scope outlined in the curriculum, has a sufficiently deep insight into the subject; is able to answer all questions clearly, exhaustively, and with no outside help; structures their answers logically, with emphasis on the most important information; is able to analyze, compare, classify, summarize, refine, and structure the course content, giving particular attention to cause-and-effect relationships.

"Good" is given to a student whose knowledge of the subject is almost in full scope outlined in the curriculum (gaps are only present in the knowledge of some especially complex aspects); is able to answer questions exhaustively with little to no outside help; does not always put emphasis on the most important information, but does not make significant mistakes.

"Satisfactory" is given to a student who possesses the bulk of knowledge on the subject; has difficulties answering questions with no outside help, uses imprecise wording; makes mistakes in substantial number of their answers.

"Unsatisfactory" is given to a student who does not have the mandatory minimum of knowledge on the subject, is not able to give an answer even with additional guiding questions.