

EUROPEAN MEDICAL UNIVERSITY

“APPROVED”
Vice-rector of EMU,
MD, PhD, DrMedSc, Professor

_____Herman TITOV

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SYLLABUS OF THE EDUCATIONAL DISCIPLINE "MICROBIOLOGY, VIROLOGY AND IMMUNOLOGY"

Cycle of Higher Education:	second cycle of higher education (Master's degree)
Field of Study:	22 «Healthcare»
Specialty	221 Dentistry
Educational qualification	Master of Dentistry
Professional qualification	doctor
Educational program of EPP	EPP «Dentistry» 2023
Department	Department of Fundamental Disciplines
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1. Status and structure of the discipline

Discipline status	Mandatory
Discipline code in EPP/place of discipline in EPP	EC 10, professional training discipline
Course/semester	2 course (3-4 semester)
Course volume (total number of hours/ number of ECTS credits)	150 hours / 5 ECTS credits
Distribution by types of training and hours of study	Lectures 36 hours Practical classes 62 hours Independent work 52 hours
Number of Chapter :	1
Number of content sections	4
Language of instruction	English
Form of education	Full-time
Type of final control	Exam

2. Short summary of educational discipline

Prerequisites: Microbiology, virology and immunology as an educational discipline is based on the knowledge acquired by students from such disciplines as medical biology, medical and biological physics and informatics, biological chemistry, histology, cytology and embryology, human anatomy and physiology and is integrated with these disciplines.

Lays the foundations for students to study general hygiene, epidemiology, pathological physiology, pathological anatomy, immunology and allergology, infectious diseases and other clinical disciplines, which involves the integration of teaching with these disciplines and the application of knowledge of microbiology, virology and immunology in the process of further education and in the professional activity.

The purpose of teaching the educational discipline "Microbiology, virology and immunology" is to ensure the knowledge of morphology, physiology, ecology, genetics, taxonomy of microorganisms, specific mechanisms of protection of the human body against pathogenic microorganisms, as well as to form the necessary skills in the future practical activity of the specialist. and skills.

Postrequisites: Propaedeutics of internal medicine, Internal medicine, Surgery, Social medicine, public health and the basics of evidence-based medicine, Midwifery, Emergency and urgent medical care, General medical training.

3. The task of studying the discipline

The main tasks of the study of the discipline "Microbiology, virology and immunology" are to lay the foundation for students to study theoretical knowledge, mastering practical skills and abilities in microbiology, virology and immunology, which involves the integration of teaching with departments of a clinical profile and the formation of the ability to apply knowledge and skills in

professional activities. Formation of a future specialist capable of solving clinical problems using acquired knowledge and skills in the discipline, laying the foundations of a healthy lifestyle.

4. Appointment of the discipline

Competencies

General competencies (GC): GC 1-3, GC -6, GC-7, GC-9, GC-10

GC 1	The ability to think abstractly, analyze and synthesize. The ability to learn and develop.
GC 2	Knowledge and understanding of the subject area and understanding of the multi-level nature of professional activity.
GC 3	The ability to apply professional knowledge and practical skills in medical practice..
GC 6	Skills in using information and communication technologies
GC 7	Ability to search, process and analyze information from various sources.
GC 9	Ability to identify, pose, and solve problems.
GC 10	The ability to be critical and self-critical

Special (professional, subject) competencies (SC): SC 2, SC 5, SC 16

SC 2	Ability to interpret the results of laboratory and instrumental studies.
SC 5	Ability to design the process of providing medical care: determine approaches, plans, types and principles of treatment of diseases of the organs and tissues of the oral cavity and maxillofacial region.
SC 16	Ability to organize and conduct rehabilitation activities and care for patients with diseases of the oral cavity and maxillofacial region.

Program learning outcomes (PLO): PLO 1-4, PLO 19, PLO 21.

PLO 1	To identify and identify the leading clinical symptoms and syndromes (according to list 1); using standard methods, using preliminary data from the patient's history, patient examination data, knowledge about the person, his organs and systems, to establish a probable nosological or syndromic preliminary clinical diagnosis of a dental disease (according to list 2).
PLO 2	Collect information about the patient's general condition, assess the patient's psychomotor and physical development, the condition of the maxillofacial organs, and evaluate information regarding the diagnosis based on the results of laboratory and instrumental studies (according to list 5).
PLO 3	To prescribe and analyze additional (mandatory and optional) examination methods (laboratory, radiological, functional and/or instrumental) according to list 5, patients with diseases of the organs and tissues of the oral cavity and maxillofacial region for differential diagnosis of diseases (according to list 2).
PLO 4	Determine the final clinical diagnosis in compliance with relevant ethical and legal norms, by making a reasoned decision and logical analysis of the obtained subjective and objective data of clinical, additional examination, and differential diagnostics under the supervision of the head physician in a medical institution (according to list 2.1).
PLO 19	To comply with the requirements of ethics, bioethics and deontology in their professional activities.

PLO 21	Perform medical manipulations based on a preliminary and/or final clinical diagnosis (according to lists 2, 2.1) for different segments of the population and in different conditions (according to list 6).
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5. Content of the discipline

Lectures plan (L)

№	THEMES	hours
Chapter 1: "Microbiology, Virology and Immunology"		
Content section 1		
1.	Introduction. Morphology and structure of bacteria.	2
2.	Physiology of microorganisms.	2
3.	General virology. Bacteriophages.	2
4.	Genetics of bacteria. Antibiotics.	2
Content section 2		
5.	Ecology of microorganisms.	2
6.	Infection and immunity. Nonspecific protection factors.	2
7.	Antigens and antibodies.	2
8.	The immune system of the body. Forms of immune response.	2
9.	Immunopathology.	2
Content section 3		
10	Pathogenic pyogenic cocci (staphylococci, streptococci, meningococci, gonococci).	2
11	Pathogens of bacterial intestinal infections (Escherichia, Salmonella, Shigella, Vibrio).	2
12	Pathogens of diphtheria, tuberculosis and whooping cough.	2
13	Pathogens of anaerobic infections. Twisted forms of pathogenic microorganisms.	2
14	Pathogenic fungi and actinomycetes. Pathogens of zoonotic infections	2
Content section 4		
15	Dental microbiology.	2
16	Pathogens of respiratory viral infections. Enteroviruses. Rhabdoviruses	2
17	Hepatitis viruses.	2
18	Retroviruses, general characteristics. Oncoviruses. HIV. Prions.	2
In total		36

Practical lessons plan (PL)

№	THEMES	hours
2nd year, 3 semester		
1	Organization of bacteriological laboratory. microorganisms Microscopy. Dyes and simple dyeing methods.	2
2	Morphology and structure of bacteria. Gram staining of bacteria.	2
3	Morphology of spirochetes, actinomycetes, fungi. Complex painting methods.	2
4	Physiology of microorganisms. Isolation of pure cultures of aerobic and anaerobic bacteria.	2
5	Cultivation and indication of viruses. Bacteriophages.	2
6	Microbiological basics of sterilization and disinfection, concepts of asepsis and antiseptics.	2
7	Chemotherapeutic drugs. Antibiotics.	2
8	Microbiome of the human body. Dysbiosis. Probiotics.	2
9	Sanitary virology and bacteriology.	2
10	Final control "General microbiology".	2
11	Factors of non-specific protection of the body against microorganisms.	2
12	Antigens and antibodies.	2
13	Serological reactions: RA, RPGA, RIF, ELISA, immunoblotting. Form of immune response	2
14	Serological reactions: RP, RSK, RN..	2
15	Genodiagnostics, PCR	2
16	Final control "Infection and immunity".	2
Total for the 2nd year, 3th semester		32
2nd year, 4 semester		
1	Staphylococci and streptococci. Microbiological diagnosis of diseases caused by staphylococci and streptococci. Meningococci and gonococci. Microbiological diagnosis of diseases caused by meningococci and gonococci.	2
2	Escherichia. Microbiological diagnosis of diseases caused by Escherichia coli. Shigels Microbiological diagnosis of dysentery. Salmonella. Microbiological diagnosis of typhoid and paratyphoid diseases and salmonellosis gastroenteritis.	2
3	Microbiological diagnostics of food toxic infections and intoxications. Vibrios. Microbiological diagnosis of cholera. Helicobacter pylori, microbiological diagnosis of helicobacteriosis	2
4	Corynebacteria. Microbiological diagnosis of diphtheria. Bordetels, microbiological diagnosis of whooping cough.	2

5	Mycobacteria. Microbiological diagnosis of tuberculosis and mycobacteria.	2
6	Causative agents of anaerobic infections. Microbiological diagnosis of gas gangrene, tetanus, botulism.	2
7	Spirochetes Microbiological diagnosis of syphilis, leptospirosis, typhus, Lyme disease.	2
8	Rickettsia, chlamydia, mycoplasma. Microbiological diagnosis of rickettsiosis, chlamydia and mycoplasmosis.	2
9	Pathogens diagnosis of zoonotic infections: plague, anthrax, brucellosis, tularemia.	2
10	Pathogenic fungi and actinomycetes. Microbiological diagnosis of mycoses and actinomycoses.	
11	The causative agents of protozoan infections. Tropical medicine.	2
12	Content control "Pathogenic prokaryotes and eukaryotes".	2
13	Orthomyxoviruses. Laboratory diagnosis of influenza. Paramyxoviruses. Laboratory diagnosis of measles. Coronaviruses. Covid 19.	2
14	Herpesviruses, Adenoviruses, Rhabdoviruses. Laboratory diagnosis of. Picornaviruses. Laboratory diagnostics of enterovirus infections	2
15	Summary control	2
In total, for the 2nd year, 4th semester		30
In total		62

Independent work topics (IW)

№	THEMES	hours
1.	Stages of development of microbiology	4
2.	Aerobic and anaerobic bacteria.	4
3.	Fundamentals of sanitary virology and bacteriology	4
4.	Main stages of development of immunology	4
5.	Parasitic protozoa	4
6.	Rickettsia, chlamydia, mycoplasma	4
7.	Spirochetes	4
8.	Gram-negative non-fermenting bacteria	4
9.	Other pathogenic bacteria	4
10.	Virus cultivation and identification	4
11.	Ecological group of arboviruses	3
12.	Other RNA-genomic viruses	3
13.	Poxviruses, papovaviruses, parvoviruses	3

14.	General characteristics of clinical microbiology	3
In total		52

The topics of the lecture course in the 1st year reveal the problematic issues of the relevant sections of " MICROBIOLOGY, VIROLOGY AND IMMUNOLOGY ".

The applicant's independent work involves preparation for practical classes and final class, mastering topics for independent work, preparation of abstract reports, presentations, tables. Control of mastering the topics of practical classes and independent work is carried out in practical classes and the final class and exam in the discipline.

Individual work includes researching scientific literature, preparing reviews on the given topics for presentation, performing scientific and practical research, participation in specialized Olympiads, scientific and practical conferences, competitions, scientific works.

Methodical recommendations for practical classes, independent work, lecture materials are available on the website of the department.

The way to get materials: EMUsite/Student/Department of fundamental disciplines/Educational and methodological support of the department/"MICROBIOLOGY, VIROLOGY AND IMMUNOLOGY"/ or follow the link Department of fundamental disciplines/Discipline "MICROBIOLOGY, VIROLOGY AND IMMUNOLOGY". Materials are accessed from the student's Office 365-based corporate account.

6. Forms and methods of monitoring learning success

Current control in practical classes	Methods: individual oral survey, structured written works, test tasks with the choice of correct answers.
Control of mastering the thematic section of the discipline in intermediate control classes	Methods: oral or written survey, electronic testing, <i>methods of self-control and self-assessment</i> .
Final semester control	According to the regulation on control measures in EMU (regulation of EMU)
Final control of the discipline - <i>exam</i>	Methods: by exam cards in the form of an oral exam, monitoring of acquiring of practical skills (According to the Regulation on control measures in EMU (Regulation of EMU).
Tools for diagnosing learning success	Theoretical questions, tests, clinically oriented situational tasks, practical tasks, demonstration of practical skills.

7. Evaluation criteria

Knowledge assessment is carried out according to regulation on control measures in EMU (regulation of DMI TNM).

Current control	According to the four-point system of traditional grades: 5 "Excellent", 4 "Good", 3 "Satisfactory", 2 "Unsatisfactory"
Control of practical skills	According to the four-point system of traditional grades
Exam	Based on a 200-point scale (the sum of points for the current academic activity of the student, the result of passing the exam and for successful completion of an individual task, if any) Credited: 120 to 200 points Not credited: less than 120 points (see Rating scale)
Final control for the discipline	The final control of students' academic performance is carried out after completing the study of the discipline and is implemented in the form of an exam.
Discipline assessment:	The score on the discipline is determined based on the results of assessment of current activities and is expressed using a fourpoint scale : ("Excellent", "Good", "Satisfactory", "Unsatisfactory"), multi-point scale and ECTS. The assessment in the discipline consists of an assessment of the current academic performance and the result of passing the exam (in points), which is set when evaluating theoretical knowledge and practical skills in accordance with the list defined by the discipline program. The number of points that the applicant scored for current academic.
	performance in the discipline is defined as the arithmetic mean of the number of points that the applicant received during the study of the discipline (practical, seminar, laboratory classes, etc.). The resulting value of the average traditional rating is converted to points according to the scale of conversion of traditional ratings to rating points. The maximum number of points is 200.

Matching grades on a 200-point scale, a 4-point (traditional) scale, and ECTS scale

On a 200-point scale	Rating on a 4-point scale
180–200	«5» Excellent
140–179	«4» Good
120–139	«3» Satisfactory
0–119	«2» Unsatisfactory
On a 200-point scale	ECTS evaluation
192–200	A
172–191	B

148–171	C
128–147	D
120–127	E
0–119	F

Discipline/course policy

The student has the right to receive high-quality educational services, access to up-to-date scientific and educational information, qualified advice during the study of the discipline and mastering practical skills. The policy of the department in the provision of Educational Services is student-centered, based on the regulatory documents of the Ministry of Education and the Ministry of Health of Ukraine, the Charter of the EMU and the procedure for providing educational services regulated by the regulation on the organization of the educational process in the EMU and the principles of academic integrity.

Compliance with the EMU schedule, safety precautions in the classroom.

Requirements for preparing for practical classes.

Students should arrive at classes on time, without being late. A student who is more than 10 minutes late for classes is not allowed in and must work it out in accordance with the established procedure. During practical classes, the student must wear a work uniform (medical gown, cap). Students who do not have a work uniform are not allowed to attend classes. The student must follow the safety rules during practical classes and while staying in the Department's premises. When discussing theoretical issues, students should demonstrate tolerance, politeness and respect for their colleagues and the teacher; when performing practical tasks, the workplace should be kept in order and cleaned after completing practical work.

Use of mobile phones and other electronic devices. The use of mobile phones and other electronic devices in the classroom is not allowed, only during Distance Learning, provided that it is technically necessary.

Academic integrity. When studying the discipline, the student should be guided by the following regulations: on academic integrity of EMU (regulation of EMU). In case of violation of the regulations of academic integrity during the current and final controls, the student receives a grade of "2" and must work it out to the teacher in accordance with the established procedure.

Regulation on control measures in EMU (Regulation of EMU).

Skipping classes. Missed classes should be worked out in accordance with the procedure established in the regulations on control measures in the EMU (regulation of EMU) during the time determined by the work schedule (Department of fundamental disciplines) to the teacher on duty. To work out a missed lesson the student must pass a test and answer in writing or verbally the question on the topic of the lesson.

Procedure for admission to the final control in the discipline is given in the regulations on control measures and regulations on the organization of the educational process in the EMU (regulation of EMU) and regulations on control measures in the EMU (regulation of EMU). Students who do not have missed not worked out practical classes and lectures and have received an average traditional grade of at least "3" are allowed to participate in the final control.

Additional individual points. Points are awarded subject to the mandatory participation of the head, head teacher and teacher. These points are encouraging and are added once to the total score of the current academic performance and the result of passing the comprehensive exam. Their total number for one student should not exceed 10, and the final amount of points for an academic discipline should not exceed 200 points.

Individual tasks include:

- 1) writing essays and creating multimedia presentations with reports at meetings of the student scientific group of the department – 3 points;
- 2) participation in the creation of tables, graphological structure, posters on the topics of practical classes – 2 points;
- 3) participation in the student competition in the discipline at the First Stage – 1 point;
- 4) participation/prize-winner of the All-Ukrainian student competition in the discipline - 7/10 points;
- 5) author or co-author of abstracts/article – 2/5 points;
- 6) author or co-author of an oral/information stand report at a scientific conference – 6/3 points;
- 7) author of a student scientific paper accepted for participation or awarded by a diploma of I-III degree in the All – Ukrainian competition of student scientific papers at Stage II - 8 (participation) or 10 (diploma) points.

Resolving conflict issues. If there are misunderstandings and complaints against the teacher due to quality of educational services provided, knowledge assessment, and other conflict situations, the student must first report his/her claims to the teacher. If the conflict issue is not resolved, the student has the right to submit an appeal to the head of the department in accordance with the regulations on consideration of applications from applicants for higher education in EMU (regulation of EMU), Regulations on consideration of applications, complaints, and proposals of students in EMU (regulation of EMU), Regulations on meeting the requirements of the organization of the educational process (regulation of EMU), Regulation on the appeal of the results of the final control of knowledge of applicants for higher education in EMU (regulation of EMU), Regulations on safe educational environment in EMU (regulation of EMU).

Policy in the context of distance learning. The procedure for distance learning is regulated by regulation of EMU. The main training platforms for conducting training sessions are Microsoft Teams, Zoom. The procedure for conducting practical classes and lectures, working out and consultations during Distance Learning is published on the Department's Web page Department of fundamental disciplines.

Feedback from the teacher is provided directly during the lesson and/or consultation, and is also possible via email (in case of force majeure) during working hours.

Training resources

1. Educational and methodological support of the discipline is published on the website of the Department (Department of fundamental disciplines). Consultations are held according to the consultation schedule.
2. Schedule and distribution of groups by teacher are published on the Department's Web page (Department of fundamental disciplines).
3. Questions for intermediate and final control of the discipline are published on the Department's Web page (Department of fundamental disciplines).

8. Рекомендована література.

1. . Brooks G.F., Carroll K.C., Butel J.S, Morse S.A., Mietzner T.A. Jawetz, Melnick & Adelberg's Medical Microbiology 26th Edition. – McGraw Hill Medical, 2013. – 864 p.
2. Forbes B.A., Sahm D.E., Weissfeld A.s. Bailey & Scott's Diagnostic Microbiology 12th Edition. - Philadelphia: Mosby Elsevier, 2007. – 983 p.
3. Kapoor K. Illustrated Dictionary of Microbiology - New Delhi: Oxford Book Company, 2010. - 299 p.
4. Lamont R. J. Jenkinson H. F. Oral Microbiology at a Glance. - John Wiley & Sons, 2007.- 95 p.
5. Bergey's. Manual of Determinative Bacteriology. – Baltimore, 1997

Information resources:

1. Website of the Testing Center of the Ministry of Health of Ukraine - <http://testcentr.org.ua/> - information on preparing for the licensing exam "Step 1".
2. Website of the American Society for Microbiology - <http://asm.org>.
3. Journal of Oral Microbiology - <https://www.tandfonline.com>
4. Website of open access to peer-reviewed journals on all aspects of prevention, diagnosis and treatment of disorders of the oral cavity, teeth and gums, as well as related pathophysiology and epidemiology. (BMC Oral Health - <https://bmcoralhealth.biomedcentral.com>)
5. Website of the international research project Human Oral Microbiome Database <http://www.homd.org/>
6. Website of the European Society of Clinical Microbiology and Infections Diseases - <http://www.escmid.org/sites/index.asp>.
7. Journal «Microbiology» — <http://mic.sgmjournals.org/>
8. «Selected scientific journals» — <http://dronel.genebee.msu.su/journals/microb-r.html> — a library of links to scientific journals and free resources in the field of microbiology, mycology, virology.
9. Electronic medical library <http://medkniga.at.ua> — the site hosts educational medical films, textbooks and methodological guides. Медичний сайт «Медунівер» <http://meduniver.com/Medical/Microbiology/>

Responsible for the course
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