

SYLLABUS

INTERNATIONAL
EUROPEAN UNIVERSITY



SCHOOL OF
MEDICINE

"Microbiology, Virology and Immunology"
EPP "Medicine"

2024



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1	Name of the course and educational program
	"Microbiology, Virology and Immunology" OPP EPP"Medicine"
2	Course description
	"Microbiology, Virology and Immunology" lays the foundation for the formation of further program learning outcomes in accordance with the Standard of Higher Education of Ukraine for pre-graduate training of specialists of the second (master's) level of the specialty "Medicine".
3	Background of study
	The study of the discipline "Microbiology, Virology and Immunology" is based on knowledge of the main natural science disciplines: medical biology, medical and biological physics, biological and bioorganic chemistry, human anatomy, histology, cytology and embryology, Latin, history of medicine, philosophy and is integrated with these disciplines.
4	Amount of credits/hours
	9 ECTS credits / 270 academic hours
5	Training format
	Blended learning
6	Classroom Location
	4th floor, 401 rooms
7	Full name of the teacher
	Vovk Oleksandra Olehivna , Candidate of Medical Sciences, Associate Professor of the Department of Fundamental and Medical Disciplines Gopta Olena Valeriivna , Ph.D., Associate Professor of the Department of Fundamental and Medical Preventive Disciplines
8	Pulpit

Department of Fundamental and Medical-Preventive Disciplines of the Educational Institute "EMS"





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9 Office Location

Kyiv, Akademika Glushkova Ave., 42 V, office. 523

10 Counseling

Every Wednesday from 14:00 to 15:30 with prior appointment via corporate mail

11 Teacher's e-mail

oleksandravovk@ieu.edu.ua
olenahopta@ieu.edu.ua

12 Course Objectives

The goals are determined by the content of those systemic knowledge and skills that a specialist doctor must master.

The knowledge that students receive in the discipline "Microbiology, Virology and Immunology" is basic for the block of disciplines that provide natural science (block of PN) and professional and practical (block of PP) training.

13 The role of the academic discipline in achieving program results

PLO 1. Have thorough knowledge of the structure of professional activity. Be able to carry out professional activities that require updating and integration of knowledge. Be responsible for professional development, the ability to further professional training with a high level of autonomy.

PLO 2. Understanding and knowledge of fundamental and clinical biomedical sciences, at a level sufficient to solve professional problems in the field of healthcare.

PLO 3. Specialized conceptual knowledge, including scientific achievements in the field of health care and is the basis for research, critical reflection on problems in the field of medicine and related interdisciplinary problems.

PLO 4. Identify and identify leading clinical symptoms and syndromes (according to list 1); according to standard methods, using the patient's preliminary anamnesis data, examination data of the patient, knowledge about the person, his organs and systems, to establish a preliminary clinical diagnosis of the disease (according to list 2).

PLO 7. Prescribe and analyze additional (mandatory and optional) methods of examination (laboratory, functional and/or instrumental) (according to list 4), patients with diseases of organs and body systems for differential diagnosis of diseases (according to list 2).

PLO 8. To determine the main clinical syndrome or what is the severity of the victim's condition (according to List 3) by making an informed decision and assessing the person's condition under any circumstances (in a health care institution, outside it), including in an emergency situation and hostilities, in the field, in conditions of lack of information and limited time.

PLO 9. Determine the nature and principles of treatment of patients (conservative, surgical) with diseases (according to List 2), taking into account the age of the patient, in the conditions of a health care institution, outside it and at the stages of medical evacuation, including in the field, on the basis of a preliminary clinical diagnosis, observing the relevant ethical and legal norms, by making an informed decision according to existing algorithms and standard schemes, if it is necessary to expand the standard scheme, be able to justify personalized recommendations under the supervision of a doctor-head in a medical institution.

PLO 14. Determine tactics and provide emergency medical care in emergency conditions (according to List 3) in conditions of limited time in accordance with existing clinical protocols and standards of treatment.



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The role of the academic discipline in achieving program results

PLO 19. Plan and implement a system of anti-epidemic and preventive measures for the occurrence and spread of diseases among the population.

PLO 20. Analyze the epidemiological state and carry out measures of mass and individual, general and local prevention of infectious diseases.

PLO 21. To search for the necessary information in professional literature and databases of other sources, to analyze, evaluate and apply this information.

PLO 23. Assess the impact of the environment on human health to assess the state of morbidity of the population.

PLO 24. Organize the necessary level of individual security (own and persons he cares for) in case of typical dangerous situations in the individual field of activity.

PLO 25. Clearly and unambiguously convey their own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists.

PLO 28. Make effective decisions on health problems, evaluate the necessary resources, take into account social, economic and ethical consequences.

PLO 29. Plan, organize and carry out measures for the specific prevention of infectious diseases, including according to the National Calendar of Preventive Vaccinations, both mandatory and recommended. Manage vaccine residues, organize additional vaccination campaigns, including immunoprophylaxis measures.

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Learning outcomes

- the ability to collect medical information about the patient and analyze clinical data;
- ability to determine the necessary list of laboratory and instrumental studies and evaluate their results;
- the ability to establish a preliminary and clinical diagnosis of the disease;
- ability to determine the principles and nature of treatment and prevention of diseases;
- ability to diagnose emergencies;
- the ability to solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility;
- ability to assess the impact of the environment, socio-economic and biological determinants on the health of an individual, family, population;
- ability to develop and implement scientific and applied projects in the field of health care;
- compliance with ethical principles when working with patients, laboratory animals;
- observance of professional and academic integrity, to be responsible for the reliability of the scientific results obtained.

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Course Content

SECTION I. Morphology and physiology of microorganisms. Infection. Immunity.

Content section 1, 2. Introduction to Microbiology Morphology and structure of prokaryotes and parasitic unicellular eukaryotes. Staining of microorganisms. Microscopy.

Topic 1. Introduction to the discipline. Medical microbiology as a subject. History of microbiology as a science. Organization of work in bacteriological, immunological and virological laboratories.

Original methods of microbiological research.

Topic 2. Stages of development of microbiology. Morphology and structure of prokaryotes and parasitic unicellular eukaryotes.

Topic 3. Morphology and structure of bacteria, spirochetes, actinomycetes, fungi and protozoa.

Topic 4. The structure of a bacterial cell. Simple and complex methods of staining bacteria. The Gram method and other complex staining methods.



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Course Content

Content section 3. Physiology of microorganisms (prokaryotes). Evolution and classification of microorganisms.

Topic 5. Metabolism of bacteria. Growth and reproduction of microbes. Nutrient media for the cultivation of microorganisms.

Topic 6. Isolation of pure aerobic cultures. Identification methods.

Topic 7. Bacterial respiration. Isolation of pure cultures of anaerobes.

Topic 8. Antiseptics and asepsis. Methods and means.

Content section 4. Genetics of microorganisms. Content section 5. Microbiological bases of antimicrobial chemotherapy.

Topic 9. Genetics of bacteria. Variability.

Topic 10. Chemotherapeutic drugs. Antibiotics. Content section 6. Infection.

Topic 11. Infectious process, its types and conditions of occurrence.

Topic 12. Modern methods of diagnosing infectious diseases.

Content section 7. The body's immune system. Reactions of nonspecific defense of the body against microorganisms. Content section 8. Antigens. Antibodies. Content section 9. Immune reactions. Immunopathology.

Topic 13. The main stages of the development of immunology.

Topic 14. Organs of the human immune system. Factors of nonspecific protection of the body.

Topic 15. Types and forms of immunity. Human immunological surveillance system.

Topic 16. Characteristics of antigens. Immunoglobulins as a product of the humoral immune response. Topic 17. Serological reactions. Serological reactions with labels.

Topic 18. Vaccines and immune serums.

Topic 19. Immunopathology. Assessment of the body's immune status.

SECTION II. General and special virology. Pathogenic prokaryotes, eukaryotes, fungi. Content section 10. General virology.

Topic 20. Morphology and ultrastructure of viruses.

Topic 21. Cultivation of viruses in cell cultures, in chicken embryos and in the body of laboratory animals. Indication of viral reproduction. Serological reactions in virology.

Topic 22. Genetics of viruses. Bacteriophages. Practical use.

Content section 11. Special virology.

Topic 23. Orthomyxoviruses, coronaviruses. Topic 24. Paramyxoviruses.

Topic 25. Picornaviruses. Enteroviruses.

Topic 26. Retroviruses. AIDS. RNA-genomic viruses: reoviruses, arenaviruses, rhabdoviruses. Topic 27. Herpesviruses, adenoviruses.

Topic 28. Hepatitis viruses.

Topic 29. Vesicular stomatitis virus, togaviruses, filoviruses. Topic

30. Poxviruses, papovaviruses, parvoviruses.

Topic 31. Arboviruses. Oncogenic viruses. Prions. ***Content***

section 12. Pathogenic prokaryotes and eukaryotes. Topic 32.

Staphylococci. Streptococci.

Topic 33. Meningococci. Gonococci.

Topic 34. Enterobacteria. Escherichia coli. Salmonella. Typhoid fever. Paratyphi. Salmonella gastroenteritis. Shigella. Dysentery.

Topic 35. Vibrios. Cholera.

Topic 36. Diphtheria. Bordetels. Whooping cough. Topic 37. Mycobacterium.

Tuberculosis. Leprosy

Topic 38. Anaerobes. Botulism. Tetanus. Gas anaerobic infection.

Topic 39. Plague. Tularemia. Anthrax. Brucellosis.



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15 Course Content

Topic 40. Rickettia. Typhus. Q fever.

Topic 41. Chlamydia. Mycoplasmas.

Topic 42. Spirochetes. Syphilis. Relapsing typhus. Borreliosis. Leptospirosis.

Topic 43. Pathogenic fungi. Microbiological diagnosis of mycoses. Protozoal infections.

Content section 13. Fundamentals of clinical and environmental microbiology. Content section. Topic 44. Clinical microbiology. Normal microflora of the body.

Topic 45. Dysbiosis. Correction.

Topic 46. Nosocomial infections. Iatrogenic infections.

Meaningful chapter 14. Sanitary microbiology and virology.

Topic 47. Sanitary microbiology. Microflora of soil and food. Microflora of water and air.

16 Books and materials

Main:

1. Medical Microbiology, Virology and Immunology. 3rd edition, updated and supplemented. Shirobokov V.P. – Vinnytsia: "New Book", 2021 – 920p.

2. Microbiology with the basics of immunology: textbook /V.V. Danyleichenko, Y.M. Fedechko, O.P. Korniychuk, I.I. Soloninko. 3rd edition - Kyiv: Medicine, 2020. - 376 p. (in Ukrainian).

Additional:

1. Practical Microbiology: Textbook / S.I. Klymnyuk, I.O. Sytnyk, V.P. Shirobokov; for general. eds.: V.P. Shirobokov, S.I. Klymnyuk. – Vinnytsia: New Book, 2018. – 576 p. (in Ukrainian).

2. Shirobokov V.P., Klimnyuk S.I. Microbiology, virology and immunology in questions and answers. Manual. / [Shirobokov V.P., Klymnyuk S.I., Korniychuk O.P. et al.]. – Ternopil: TDMU, 2019. – 564 p. Danyleichenko V.V.

3. Microbiology with the Basics of Immunology: A Textbook for Medical Universities / V. V. Danyleichenko, Y. M. Fedechko, O. P. Korniychuk. – 2nd ed., rework. and additional. – Kyiv: Medicine, 2009. – 391 p. (in Ukrainian).

4. Medical microbiology. Manual of Microbial Infections: Pathogenesis, Immunity, Laboratory Diagnosis and Control: 19th Edition: in 2 Volumes. Volume 2/ Michael R. Barer, Will Irving, Andrew Swan, Neljun Perera - 2021 - 386cBioorganic Chemistry: textbook/Yu. Gubskiy. – 2nd ed. – Vinnitsa: Nova Knyha, 2019. - 224p.

17 Technical requirements for working on the course

To work during the study of the discipline "Microbiology, Virology and Immunology", you need regular access to a computer (or phone) and the Internet.

To successfully study and pass the exam for the training course, you first need to familiarize yourself with the distance platform (Moodle or Classroom) and study all the folders on which there is already or in stages the information or materials for studying the course. You will also need to upload and create documents, watch a video or create one.

The ability to use remote platforms is possible only with the use of corporate mail.

If it is impossible to enter the course, you need to inform the dean's office or the headman, or directly the course teacher.

18 Learning process

The process of studying the course "Microbiology, Virology and Immunology" includes both lectures and practical Classes.

During the lectures, such teaching methods as lecture, lecture-conversation, discussion, discussion of problematic issues, demonstration, analysis of various situations in accordance with the topic of lectures will be used.

During practical classes, such teaching methods as surveys, testing, individual and team tasks, cases, preparation of reports and presentations, analytical and calculation work, solved specific tasks and situations, brainstorming will be used.



19 Signs of discipline

Term of teaching	Semester	International Disciplinary Integration	Course year (training)	Cycles: General Training/ Professional Training/ Free Choice
2 semesters	3rd, 4th semesters	yes	2nd year	Cycle of general Training

20 Grading Policy

The current performance of students is evaluated on a 4-point scale (2; 3; 4; 5) at each practical one, taking into account the approved evaluation criteria for the relevant discipline. The student must receive a grade in each topic for further conversion of grades into points on a multi-point (200-point) scale.

"5" – the student has correctly, fully and reasonably disclosed a theoretical question or completed a practical task, demonstrated the ability to independently analyze the material, use the necessary terminology and has a lexical minimum, when answering the material clearly and logically;

"4" – the student has fully disclosed the essence of the question, has the necessary terminology and lexical minimum, but makes some mistakes that did not affect the correct understanding;

"3" – is received by a student who has partially disclosed the content of the question, mastered the necessary terminology and lexical minimum at the minimum level, made mistakes of a fundamental nature.

Forms of current control:

Oral survey (frontal, individual, combined) Practical verification of formed professional skills. Test control (open and closed test tasks). The student's independent work is evaluated in practical classes and is a component of the student's final grade. The final control is carried out in the form of a test in the first and second semesters, and an exam, which includes: a) test tasks (30), compiled in accordance with the topics of the content modules; b) oral questioning – complex questions (4), which include theoretical material and practical skills in the content modes of the left.



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Grading scale

The minimum number of points that an applicant must score for current educational activities for 3 semesters for admission to the final control is 72 points. The grade for the discipline is determined as the sum of the final score for the current activity and the score for the exam and is expressed on a multi-point scale.

The grade in the discipline, which ends with the exam, is determined as the sum of points for current educational activities (at least 72), points for individual independent work of the student (no more than 12) and points for the exam (at least 50).

The total score in the discipline is 200. The total grade for the study of the discipline is set according to the national and European scales.

The final control in the form of an exam is carried out after the completion of the study of all topics of the discipline and is compiled by students during the test session.

The total final grade in points, according to the national scale and according to the ECTS scale is entered into the test and examination sheet, study card and record book of the student.

Sum of points for all types of learning activities	ECTS assessment	National scale score	
		For the sake of clarity, diffusion	For the sake of credit
180-200	And	Perfectly	Enrolled
160-179	Into	Well	
150-159	C	Satisfactory	
130-149	D		
120-129	E		
50-119	FX	unsatisfactory with the possibility of retaking	not enrolled with the possibility of retaking
0-49	F	unsatisfactory with the obligatory re-study of the discipline	not enrolled with mandatory re-study of the discipline



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How to find out your score

To check your grades for assignments and read the teacher's comments, you should check the relevant tabs of the Moodle or Classroom distance learning platforms.

You can also get information about the grades received directly from the course teacher through corporate mail or by appointment on the days of consultations (room 423).

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Course Policy

For productive educational and cognitive activities of students when studying the discipline, topical lectures and seminars are carried out in the form of presentations, group work, seminars-discussions.

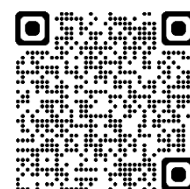
In classes and during their stay at the university, the student must treat teachers, staff and other students with respect, attend classes according to the schedule, arrive on time and not leave the classroom without the permission of the teacher. It is necessary to complete all academic tasks and work within the specified deadlines.

The teacher, in turn, must constantly improve his professional level, pedagogical skills, general culture, provide conditions for students to assimilate curricula at the level of mandatory requirements for the content, level and scope of education, promote the comprehensive professional development of students. It is imperative to adhere to the curriculum, not to be late for classes, to prevent any manifestations of corruption, discrimination, bullying, harassment and infringement of the rights of students.

A student who, for valid reasons, confirmed by documents, was not subject to current control, has the right to undergo current control within two weeks after returning to study.

A student who was absent from classes without a valid reason, did not participate in current control measures, did not liquidate academic debt, is not allowed to the final semester control of knowledge in this discipline, and on the day of passing the exam in the exam sheet, the scientific and pedagogical worker gives a grade of "not admitted". Re-passing the exam in the discipline is assigned under the condition of performing all types of educational, independent (individual) work provided for by the working curriculum of the discipline, and is carried out in accordance with the liquidation schedule approved by the directorate.

All participants in the educational process are guided by the principles of academic integrity.



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Completing the task late, correcting grades, working out

Assignments must be submitted via Moodle or Classroom by the completion dates specified in the course schedule on our website. Most of the tasks must be completed by 09:00 on the day of the next lesson in order to align them with the content of the course and activities in the group. It is best practice to complete the assignment as soon as possible after receiving it so that you have enough time to actively participate in the class.

If you need more time to complete a task, flexible deadlines are available. Completed assignments are accepted for full credit until the last lesson in the discipline according to the schedule, after which a 40% partial credit based on the grade received will be awarded within a week after the last day of classes. Tasks that did not pass at all will receive 0.

If you plan to miss classes for more than one week due to illness or other reasons, please contact your instructor to arrange alternative assignment options.



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Completing the task late, correcting grades, working out

Remember that deadlines work both ways, and meeting them will ensure that the instructor provides timely feedback on your assignments to ensure that you keep up with the course.



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Teacher's response time

Through corporate mail, within 24 hours.

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Effective communication

The main recommendations for effective communication are a corporate email directly with the course teacher; this is personal communication with classmates through social networks/corporate mails/mobile phones; this is communication directly on the course of distance platforms Moodle or Classroom; This is a face-to-face meeting with the teacher on the days of consultations.

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Course Materials Publication and Distribution Policy

Effective communication is not only about being able to speak, but also about being able to hear!! Therefore, the main recommendations for effective communication are corporate e-mail directly with the course teacher; this is personal communication with classmates through social networks/corporate mails/mobile phones; this is communication directly on the course of distance platforms Moodle or Classroom; This is a face-to-face meeting with the teacher on the days of consultations.

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Expected workload and student engagement

Separate hours should be allocated for work in this course for independent study of some lecture materials in accordance with the topic of the course (approximately 3-5 hours per week).

If circumstances arise that force you to spend more time on any of the tasks, inform the teacher by e-mail. An extension of the deadline is possible only if the teacher is informed in advance that you will not be able to submit the assignment on time. Students are expected to have a backup plan in case of computer failure or internet outages.



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Support

Electronic timetable
Library
Curated
Repository
Dean's
Office

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Course Schedule

SECTION I. Morphology and physiology of microorganisms. Infection. Immunity.				
<i>Content section 1, 2. Introduction to Microbiology Morphology and structure of prokaryotes and parasitic unicellular eukaryotes. Staining of microorganisms. Microscopy.</i>				
Topic 1. Introduction to the discipline. Medical microbiology as a subject. History of microbiology as a science. Organization of work in bacteriological, immunological and virological laboratories. Original methods of microbiological research.	6	1	1	4
Topic 2. Stages of development of microbiology. Morphology and structure of prokaryotes and parasitic unicellular eukaryotes.	7	1	2	4
Topic 3. Morphology and structure of bacteria, spirochetes, actinomycetes, fungi and protozoa.	13	1	8	4
Topic 4. The structure of a bacterial cell. Simple and complex methods of staining bacteria. The Gram method and other complex staining methods.	9	1	4	4
<i>Content section 3. Physiology of microorganisms (prokaryotes). Evolution and classification of microorganisms.</i>				
Topic 5. Metabolism of bacteria. Growth and reproduction of microbes. Nutrient media for the cultivation of microorganisms.	10	2	4	4
Topic 6. Isolation of pure aerobic cultures. Identification methods.	6	-	2	4
Topic 7. Bacterial respiration. Isolation of pure cultures of anaerobes.	4	-	2	2
Topic 8. Antiseptics and asepsis. Methods and means.	8	1	1	6
<i>Content section 4. Genetics of microorganisms. Content section 5. Microbiological bases of antimicrobial chemotherapy.</i>				
Topic 9. Genetics of bacteria. Variability.	6	1	1	4
Topic 10. Chemotherapeutic drugs. Antibiotics	5	2	1	2
<i>Content section 6. Infection</i>				
Topic 11. Infectious process, its types and conditions of occurrence.	6	2	2	2
Topic 12. Modern methods of diagnosing infectious diseases.	2	-	-	2
<i>Content section 7. The body's immune system. Reactions of nonspecific defense of the body against microorganisms. Content section 8. Antigens. Antibodies. Content section 9. Immune reactions. Immunopathology.</i>				
Topic 13. The main stages of the development of immunology.	3	1	-	2
Topic 14. Organs of the human immune system. Factors of nonspecific protection of the body.	4	1	1	2
Topic 15. Types and forms of immunity. Human immunological surveillance system.	5	2	1	2
Topic 15. Characteristics of antigens. Immunoglobulins as a product of the humoral immune response.	5	1	2	2
Topic 21. Serological reactions. Labeled serological reactions	9	1	6	2



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Topic 22. Vaccines and immune serums.	8	2	4	2
Topic 14. Immunopathology. Assessment of the body's immune status.	4	-	2	2
SECTION II. General and special virology. Pathogenic prokaryotes, eukaryotes, fungi. Content section 10. General virology				
Topic 23. Morphology and ultrastructure of viruses.	5	1	2	2
Topic 24. Cultivation of viruses in cell cultures, in chicken embryos and in the body of laboratory animals. Indication of viral reproduction. Serological reactions in virology	7	1	2	4
Topic 26. Genetics of viruses. Bacteriophages. Practical use.	2	-	-	2
Content section 11. Special virology.				
Topic 27. Orthomyxoviruses, coronaviruses.	6	2	2	2
Topic 6. Paramyxoviruses.	8	2	4	2
Topic 28. Picornaviruses. Enteroviruses	4	-	2	2
Topic 29. Retroviruses. AIDS. RNA-genomic viruses: reoviruses, arenaviruses, rhabdoviruses.	7	1	4	2
Topic 30. Herpesviruses, adenoviruses.	6	1	2	2
Topic 30. Hepatitis viruses.	6	2	2	2
Topic 31. Vesicular stomatitis virus, togaviruses, filoviruses.	2	-	-	2
Topic 32. Poxviruses, papovaviruses, parvoviruses.	2	-	-	2
Topic 33. Arboviruses. Oncogenic viruses. Prions	4	-	2	2
Content section 12. Pathogenic prokaryotes and eukaryotes.				
Topic 34. Staphylococci. Streptococci.	4	1	2	1
Topic 35. Meningococci. Gonococci.	5	1	2	2
Topic 36. Enterobacteria. Escherichia coli. Salmonella. Typhoid fever. Paratyphi. Salmonella gastroenteritis. Shigella. Dysentery.	10	1	6	3
Topic 39. Vibrios. Cholera.	5	1	2	2
Topic 40. Diphtheria. Bordetels. Whooping cough.	5	1	2	2
Topic 41. Mycobacterium. Tuberculosis. Leprosy	5	1	2	2
Topic 42. Anaerobes. Botulism. Tetanus. Gas anaerobic infection.	5	1	2	2
Topic 43. Plague. Tularemia. Anthrax. Brucellosis.	5	1	2	2
Topic 45. Rickettia. Typhus. Q fever.	4	-	2	2
Topic 46. Chlamydia. Mycoplasmas	5	1	2	2
Topic 47. Spirochetes. Syphilis. Relapsing typhus. Borreliosis. Leptospirosis	9	1	4	4
Topic 48. Pathogenic fungi. Microbiological diagnosis of mycoses. Protozoal infections.	8	-	4	4
Content section 13. Fundamentals of Clinical and Environmental Microbiology. Content section				
Topic 49. Clinical microbiology. Normal microflora of the body.	6	-	2	4
Topic 50. Dysbiosis. Correction	4	-	-	4
Topic 51. Nosocomial infections. Iatrogenic infections.	5	-	2	4
Meaningful chapter 14. Sanitary microbiology and virology				
Topic 52. Sanitary microbiology. Microflora of soil and food. Microflora of water and air.	6	-	2	4
TOTAL IN DISCIPLINE	270	40	104	126

If you want to successfully master this subject, you must be:

- persistent, attentive and inquisitive;
- creative and cheerful, open to communication and discussion;
- ready to receive information and knowledge on the subject not only at lectures, but also in extracurricular time.

See you!