Odesa National Medical University
Medical faculty
Microbiology, Virology and Immunology Department

Syllabus course
Microbiology with the basics of Immunology

Volum:	5 credits into ECTS, 150 hours
Semester, Year	III-IV semester, 2 cour
Days, Time, Place:	According the Schedule
Преподаватель (-и)	Hruzewskiy O.A., Head of Departmeent, MD, PhD, associate professor; Golovatiuk O.L., MD, PhD, associate professor; Koltsova I.G., MD, PhD, associate professor; Venger A.M., PhD, associate professor; Hrydina T.L., PhD, associate professor; Borovik A.P., MD, PhD, senior lecturer of the department; Avratinskiy O.Y. MD, PhD, assistant of department; Denisko T.V., assistant of department; Dubina A.V., assistant of department; Kaglyak M.D., assistant of department; Kobylnik S.M., assistant of department; Kurtova M.M., MD, PhD, assistant of department; Nikolayeva O.V., PhD, assistant of department; Radkevich K.V., assistant of department; Tabulina A.M., , assistant of department; Tarasov Y.V., assistant of department; Shevchuk H.Y., PhD, assistant of department
Phone	(480) 753-0981
E-mail:	onmedumicrobio@onmedu.edu.ua; materials@microbiologydepart.com
Workplace	Microbiology, Virology and Immunology Department, 1 Knyazeska str., app. 1-6
Consultations	*Face-to-face consultations:* Thursday, 14.30-16.00

COMMUNICATION

Communication with students will be carried out using E-mail, telephone, in classrooms.

ANNOTATION OF THE COURSE

The subject of study of the discipline "Microbiology, Virology and Immunology" is the properties of pathogenic representatives of the world of microbes, their interaction with the human body, mechanisms of development of infectious diseases, methods of their diagnosis, specific prevention and treatment.

Prerequisites: The basis for mastering the discipline is knowledge, skills and abilities acquired in the process of studying medical biology, medical and biological

physics, biological and bioorganic chemistry, human anatomy, histology, cytology and embryology, Latin, history of medicine, philosophy and integrates with these disciplines.

Post-requisites: Lays the foundations for students to study general hygiene, epidemiology, pathological physiology, pathological anatomy, immunology and allergology, infectious diseases, internal diseases, surgical diseases and childhood diseases and other clinical disciplines, provides for the integration of teaching with these disciplines and the use of knowledge in microbiology, virology and immunology in the process of further education and professional activity.

Purpose of the course. Lays the foundations for the study of the physiological role of microbes in the human body and the prevention of violations of these functions in the process of drug interventions.

Discipline objectives:

- to interpret the biological properties of pathogenic and non-pathogenic microorganisms, viruses and the patterns of their interaction with the macroorganism, with the human microbiota and the external environment;
- to determine the methods of microbiological and virological diagnostics, etiotropic therapy and specific prevention of infectious diseases.
- explain the structure of the immune system of the human body;
- to interpret the main mechanisms of the formation of the body's immune response;
- to determine the main types of pathological reactions of the immune system and the relationship with the occurrence of the most common human diseases.

Expected results

As a result of studying the discipline the student have ***to know***:

- algorithm for carrying out serological reactions in infectious diseases;
- algorithm for conducting microbiological research of biological fluids and secretions;
- an algorithm for conducting chemical, organoleptic, bacteriological types of research on the quality of food and water.

As a result of studying the discipline the student have ***be able to:***

- evaluate the results of laboratory and instrumental studies;
- provide for the negative consequences of exposure to hazardous factors on the human body;
- to master modern methods of microbiological research in infectious diseases;
- to analyze the principles of obtaining vaccine preparations, methods of their standardization and control, practical use;
- to master the principles of production of immune sera, methods of their standardization, control, practical value;
- to interpret the development of medicine in a historical retrospective;
- to interpret the main historical and medical events;
- to demonstrate possession of moral and ethical principles of attitude towards a living person, her body as an object of anatomical and clinical research.

DESCRIPTION OF THE COURSE

Forms and methods of teaching

The course will be presented in the form of lectures (20 hours) and practical lessons (70 hours), organization of students' independent work (60 hours).

In practical classes, the methods of educational and cognitive activity will be used: a research method for studying microorganisms - causative agents of human infectious diseases. The format of practical training includes: - checking the knowledge of the prepared material (entrance testing, survey); - receiving tasks for the next lesson and clarifying the key questions that need to be worked out.

The content of the discipline.

PART 1

SENSE SECTION 1. INTRODUCTION TO MICROBIOLOGY. MORPHOLOGY AND PHYSIOLOGY OF MICROORGANISMS

Theme 1. The subject and tasks of medical microbiology. Organization and equipment of microbiological laboratory. Microscopic examination of microorganisms. Types and technique of microscopy.

Theme 2. Main bacterial shapes. Simple and complex methods of staining. Gram staining.

Theme 3. Structure of bacterial cell. Morphology and cell structure of actinomycetes, spirochaetae, Fungi and protozoa.

Theme 4. Physiology of bacteria. Culture media. Methods of sterilization. Disinfection.

Theme 5. Bacteriological method of examination. Isolation of pure cultures of aerobic and anaerobic bacteria. Cultural properties of bacteria. Biochemical properties of bacteria.

Theme 6. Bacteriophages. Microbial genetics. Molecular examination methods.

Theme 7. Microbiological basics of antimicrobial chemotherapy and antiseptics.

Theme 8. Drilling of the algorithm of application general diagnostic methods in microbiology (themes 1-7).

SENSE SECTION 2. INFECTION. IMMUNITY

Theme 9. Infection. Biological method of investigation.

Theme 10. Immunity. Types of immunity. Immune system. Antigens. Antibodies. Non-specific factors of defense. Complement system. Phagocytosis.

Theme 11. Antigen-antibody reactions (serological tests): agglutination test (AT), precipitation test (PT). Neutralization test. Serological tests with the use of labels.

Theme 12. Humoral and cell-mediated immune response. Biology of immune response. Regulation of immune reactions. Theory of immunogenesis.

Theme 13. Applied immunology: immunodiagnostics, immunoprophylaxis, immunotherapy.

Theme 14. Immune pathology: allergy, concept of immune status, immunodeficiencies.

Theme 15. Drilling of the algorithm for using laboratory methods of diagnostics in immunology (themes 9-14).

SENSE SECTION 3. VIROLOGY

Theme 16. General virology. Culturing of viruses. Prions. Methods of laboratory diagnostics of viral infections.

Theme 17. RNA-genomic viruses: orthomyxoviruses, paramyxoviruses, picornaviruses, rhabdoviruses, arboviruses.

Theme 18. DNA-genomic viruses.

Theme 19. Hepatitis viruses. Oncoviruses. HIV.

Theme 20. Drilling of algorithm for laboratory diagnostics of viral infections (themes 16-19).

PART 2. SENSE SECTION 4. SPECIAL MICROBIOLOGY. PATHOGENIC PROCARIOTS AND EUCARIOTS

Theme 21. Staphylococci and streptococci. Meningococci and gonococci.

Theme 22. Cloctridia of wound anaerobic infection. Tetanus. Botulism.

Theme 23. Pathogenic spirochaetae..

Theme 24. Causative agents of cholera. Causative agents of zoonotic infections.

Theme 25. Corynebacteria.

Theme 26. Mycobacteria. Actinomycetes.

Theme 27. General characteristics of intestinal bacteria. Esherichia, Shigella.

Theme 28. Pathogenic Salmonellae: pathogens of typhoid fever and paratyphoid, gastroenterocolitis.

Theme 29. Pathogenic Rickettsiae, Chlamydiae, Mycoplasmas.

Theme 30. Pathogenic fungi. Pathogenic protozoa.

Theme 31. Drilling of the algorithm for laboratory diagnostics of coccal, clostridial, spirochaetal, zoonotic corynebacterial, mycobacterial, actinomycetal and nocardial infections (themes 21-30).

List of recommended literature

Main:

1. Medical Microbiology, Virology Immunology (Медична мікробіологія, вірусологія та імунологія). Підручник. Shyrobokov V.P. (Широбоков В.П.). Нова книга, 2019

2. Gaidash L.S., Flegontova V,V. Microbiology, virology and immunology. – Lugansk-2004 vol. 1 – 3.

Additional:

1. Anantharyan R. Jayaram Paniker C. K. Textbook of Microbiology. 9-th Edition.- Orient Longman, 2012.

2. Warren Levinson, Medical Microbiology Immunology: Examination & Board Review . -Eighth edition / Lange Medical Bool /McGraw-Hill Medical Publishing Division/ - 2004/ -649 p

3. Arora, D.R. Textbook of Microbiology.-CRS publishers and Distributors, 2001

4. Chan E.C.S., Pelczar Michael J., Krieg Noel R. Microbiology. Concepts and Applications.- McGraw-Hill, Inc.,1993

5. Chakraborty P. A Textbook of Microbiology.- New central book agency(P) LTD., 2001

6. Choppa H.L. Prof. Textbook of Medical Microbiology,1995

7. Greenwood David, Peutherer John, Slack Richard. Medical Microbiology.- Churchill Livingstone, 1997

8. Gupte, Satish M.D. The Short Textbook of Medical Microbiology. Fifth Edition.- Jaypee Brothers, Medical Publishers, New Delhi (India),1993

9. Jawetz, Melnick and Adelberg's Medical Microbiology. 21st Edition/ Edited by Brooks G.F., Butel J.S., Morse S.A.-Librairie du Liban, Lebanon, Appleton and Lange, California,1998

10. Kabajashi George S., Murray Patrick R., Pfaller Michael A., Rosenthal Ken S. Medical Microbiology.- Mosby,1998

11. Mackie and McCartney. Practical Medical Microbiology. 14th Edition/ Edited by Colle J.G., Fraser A.G., Marmion B.P., Sinmons A.- New York, Edinburgh, London, Madrid, Melbourne, Tokyo, 1996

Informational resources

1. Microbiology and immunology on-line http://www.microbiologybook.org/
2. On-line microbiology note http://www.microbiologyinfo.com/
3. Centers for diseases control and prevention www.cdc.gov

CRITERIA EVALUATION

Current control.

At the current stage, students' answers to theoretical questions, the performance of practical work (research), the quality of maintaining the research protocol in accordance with the requirements, the ability to analyze and interpret research results and correctly draw informed conclusions, solving situational problems are taken into account. The assessment is carried out according to the traditional 4-point scale.

At the last lesson, in each content section, an oral survey and written test control are carried out. Tests are composed of test items from the database of the Testing Center of the Ministry of Health of Ukraine and tests developed by the department.

Final control

The final control is allowed for students who have successfully completed the final testing, which was carried out in the last practical lesson. The final test consists of 50 test items from the base of the Testing Center of the Ministry of Health of Ukraine and test items of examination booklets of previous years, 30 minutes will be allowed to complete it.

Final test control is assessed:

Number of correct answers	50	48-49	45-46
Traditional grade	5	4	3

The student has two more attempts to pass the FTC if there were less than 45 correct answers.

The form of the final control is an exam, which involves an oral answer to the questions of the examination card and the implementation of practical work.

EVALUATION CRITERIA FOR STUDENT RESPONSE AT EXAM

Holding of EXAM and estimation of student's knowledge on the EXAM

DESCRIPTION OF RESPONSE	MARK
Provides a complete, detailed answer to this question, shows a set of conscious knowledge in the discipline, conclusively revealed the main provisions of questions, the answer is a clear structure, a logical sequence that reflects the essence of disclosed concepts, theories and phenomena. Knowledge on specific issues are shown on an understanding of their background in the microbiology, virology and immunology and their integration with other disciplines - from biology, human anatomy, histology, and medical chemistry, physiology, pathological anatomy, pathological physiology and pharmacology. The answer contained a	5

literary language, using modern terminology. The student demonstrates good skills in carrying out practical tasks, correctly evaluates the results. May be admitted shortcomings in the definition of concepts student self-corrected by student during the answer.	
Provide a complete, detailed answer to the questions, show ability to identify essential and nonessential features cause-effect relationships. The answer is clearly structured, logical, set out the standard language, using modern terminology. The student demonstrates sufficient skills in carrying out practical tasks, correctly evaluates the results. 2-3 errors or minor errors can be corrected with the help of teacher.	4
Given not enough full and detailed response. The logic and sequence of presentation has mistakes. Mistakes in the disclosure of the concepts, use of terms. The student is not able to independently identify essential and nonessential attributes and causal relationships. In response, there are no conclusions. The ability to uncover the meaning of generalized knowledge is not shown. The student demonstrates skills in carrying out practical tasks, but evaluates the results not fully and accurately. Speech requires amendment, correction.	3
The answer is the fragments of knowledge with substantial errors on the matter. Irrational statements. The student is not aware of the relationship under discussion on the ticket with other objects of discipline. There are no conclusions, specification, and conclusiveness of the exposition. Speech is not literate, special terminology is not used. The student demonstrates inadequate skills and knowledge, can not cope with the practical work and evaluation of the results. For more specific questions of the teacher do not lead to a correction of the student answer.	2

Salfwork of students. The work of students consists of independent study with a specific list of topics or topics requiring in-depth study. CP controlled in the form of tests and control works. The question is with the fact that reserved for self-study is included in the control activities. The entire volume of SR contains tasks that require systematic independent work from the student.

Evaluation criteria

The university uses various forms of control of classes in a particular discipline (oral, written, combined, testing, practical skills, etc.). The results of students' academic performance are presented in the form of a grade on the national scale, 200-point and ECTS scale and have standardized generalized criteria for knowledge assessment: national scale: - grade "excellent" is given to a student who worked systematically during the semester. knowledge of program material, is able to successfully perform tasks provided by the program, mastered the content of basic and additional literature, realized the relationship of individual sections of the discipline, their importance for future professions, showed creative abilities in understanding and using curriculum, showed the ability to independently updating and replenishing knowledge; level of competence - high (creative); - a grade of "good" is given to a student who has shown full knowledge of the curriculum,

successfully completes the tasks provided by the program, mastered the basic literature recommended by the program, showed a sufficient level of knowledge of the discipline and is able to independently update and update during further study and professional activity; level of competence - sufficient (constructive-variable); - the grade "satisfactory" is given to the student who has shown knowledge of the basic educational program material in the volume necessary for the further training and the subsequent work on a profession, copes with performance of the tasks provided by the program, has made separate mistakes in answers on examination and at performance of examination tasks, but has the necessary knowledge to overcome mistakes under the guidance of a researcher; level of competence - average (reproductive); - the grade "unsatisfactory" is given to the student who did not show sufficient knowledge of the basic educational and program material, made fundamental mistakes in performance of the tasks provided by the program, cannot use the knowledge at the further training without the teacher's help, failed to master skills of independent work; level of competence - low (receptive-productive). 29 Final control in the form of tests is assessed on a two-point scale: - grade "credited" is given to a student who has completed the curriculum of the discipline, has no academic debt; level of competence - high (creative); - the grade "not credited" is given to a student who has not fulfilled the curriculum of the discipline, has an academic debt (average score below 3.0 and / or absences); level of competence - low (receptive-productive). The multi-point scale characterizes the actual success of each student in mastering the discipline. Conversion of the traditional grade from the discipline to 200-point is performed by the information and computer center of the university program "Contingent" by the formula: average grade point average (current / from the discipline) x 40

national grade	point
"5"	185-200
"4"	151-184
"3	120-150

The ECTS rating scale evaluates the achievements of students in the discipline who study in one course of one specialty, according to their scores, by ranking, namely:

ECTS grade	Statistical indicators
“A”	Top 10% of students
“B”	next 25% of students
“C”	next 30% of students
“D”	next 25% of students
“E”	last 10% of students

The ECTS scale establishes the student's belonging to the group of best or worst among the reference group of classmates (faculty, specialty), ie his rating. When converting from a multi-point scale, as a rule, the limits of grades "A", "B", "C", "D", "E" do not coincide with the limits of grades "5", "4", "3" on the traditional scale. Grade "A" on the ECTS scale cannot be equal to grade "excellent", and grade "B" -

grade "good" and so on. Students who receive grades "Fx" and "F" ("2") are not included in the list of ranked students. Such students automatically receive a score of "E" after re-assembly. The grade "Fx" is given to students who scored the minimum number of points for the current educational activity, but who did not pass the final 30 control. Grade "F" is given to students who have attended all classes in the discipline, but did not score an average score (3.00) for current academic activities and are not admitted to the final control. Criteria for assessing the current performance of students should be reflected by the departments in the work programs in the disciplines, indicating a clear structure of student receipt in the assessment class.

COURSE POLICY

Deadline and retake policy:

To prepare for the tests, a certain period is given. Control tests that are passed in violation of the deadlines without good reason are evaluated for a lower grade (-1 or 2 points). After the deadlines, it is impossible to get the maximum number of points for the test.

Academic Integrity Policy: Cheating during exams is prohibited (including using mobile devices).

Attendance Policy: Practical classes are compulsory and no points will be awarded for attending lectures. Illness is considered a good reason for absence from classes, confirmed by a certificate from a doctor (sick leave).

Mobile devices: the use of mobile devices during the control of students' knowledge is prohibited in the classroom.