



Syllabus on the discipline “Clinical Microbiology” (elective course)

1. General information	
Faculty	Medical
Educational program (<i>field, specialty, level of higher education, form of education</i>)	22 Healthcare, 222 «Medicine» , second (Master’s) level of higher education, full-time
Academic year	2021-2022
Discipline name, code (<i>electronic identification at the Danylo Halyskyi Lviv National Medical University website</i>)	“Clinical Microbiology” http://new.meduniv.lviv.ua/kafedry/kafedra-mikrobiologiyi/
Department (<i>name, address, phone, e-mail</i>)	Department of Microbiology 79005, Lviv, 12 Zelena street
Chair of the Department (<i>e-mail</i>)	Prof. O.P. Korniychuk o_korniychuk@ukr.net
Educational year (<i>year of the discipline study</i>)	III year
Semester (<i>semester of the discipline study</i>)	V Semester
Type of the discipline/module (<i>mandatory / optional</i>)	Optional
Teaching staff (<i>names, surnames, scientific degrees and titles, of the teaching staff, e- mails</i>)	ass. A. Hural – adriana.hural43@gmail.com
Erasmus yes/no (<i>availability of discipline for students within the program Erasmus+</i>)	-
Person, responsible for syllabus (<i>the person to whom comments on the syllabus should be given, e-mail</i>)	ass. A. Hural
Number of ECTS credits	3,0 credits ECTS
Number of hours (<i>lectures / practical classes / self- reliance work</i>)	Lecture – 10 hours. Practical classes – 10 hours. Self - educational works – 70 hours.
Language	English
Information on the consultations	Consultations are held in accordance with the schedule approved by the Chair of the department

2. Short resume of the discipline

Clinical microbiology studies the properties of opportunistic pathogens of the world of

microbes, their interaction with the human body, the role of normal microflora of the human body, diagnosis, principles of treatment and prevention of opportunistic infections.

The study of this discipline is necessary to understand the peculiarities of the epidemiology and pathogenesis of nosocomial infections, the problems of resistance of their pathogens to antimicrobials; the need to prevent changes in the normal microflora in the process of drug interventions.

In order to integrate into the world educational and scientific space, the main directions of development of modern diagnostics, treatment and prevention of diseases caused by microorganisms were taken into account and educational material from international textbooks on microbiology was introduced.

3. Objective and tasks of the discipline

- The purpose of studying the discipline "Clinical Microbiology" is to train a specialist who can solve complex problems of microbiological diagnosis, etiotropic treatment and prevention of diseases caused by opportunistic pathogens.

Clinical microbiology is the basis for the study of internal medicine, surgery, pediatrics and other clinical disciplines, which involves the integration of teaching with these disciplines and the application of knowledge of clinical microbiology in further education and professional activities.

The main tasks of studying the discipline "Clinical Microbiology" are:

- to interpret the biological properties of opportunistic pathogens, patterns of their interaction with the macroorganism and resistance to a number of environmental factors;
- to interpret the main mechanisms of formation of the immune response in opportunistic diseases;
- to determine the methods of microbiological diagnosis of opportunistic diseases;
- to determine the principles of etiotropic therapy and prevention of diseases caused by opportunistic pathogens.
- to explain the role and functions of the immune system of the human body;
- to interpret the main mechanisms of formation of the immune response of the human body;
- to identify the main types of pathological reactions of the immune system and the relationship with the occurrence of the most common human diseases.

Competencies and results of studying

GC-1. Ability to abstract thinking, analysis and synthesis.

GC -2. Ability to learn and master modern knowledge.

GC -4. Knowledge and understanding of the subject area and understanding of professional activity.

GC -5. Ability to adapt and act in a new situation.

GC -6. Ability to make informed decisions.

GC -8. Interpersonal skills.

GC -9. Ability to communicate in the state language both orally and in writing.

GC -12. Definiteness and perseverance in terms of tasks and responsibilities.

GC -13. Ability to act socially responsibly and consciously.

PC-2. Ability to determine the required list of laboratory and instrumental studies and evaluate their results.

PC-3. Ability to establish a preliminary and clinical diagnosis of the disease.

PC-6. Ability to determine the principles and nature of treatment of diseases.

PC-14. Ability to plan and carry out preventive and anti-epidemic measures against infectious diseases.

According to the requirements of the Standard of Higher Education, the discipline "Clinical Microbiology" provides students with the following competencies:

- integral: - Ability to solve typical and complex specialized tasks and practical problems in professional health care activities, or in the process of training involving microbiological research and / or innovation and characterized by complexity and uncertainty of the conditions and requirements;
- general: - Ability to apply knowledge in practical situations. Ability to exercise self-regulation,

healthy lifestyle, ability to adapt and act in a new situation. Ability to choose a communication strategy; ability to work in a team; interpersonal skills. Skills in the use of information and communication technologies. Ability to abstract thinking, analysis and synthesis, the ability to learn and to be modernly trained. Determination and persistence on the tasks and duties taken. Ability to act socially responsible and with public consciousness. The desire to save the environment. Universal competencies that do not depend on the subject area but are important for successful further professional and social activities of the applicant in various fields and for his personal development.

- special (professional, subject): - Ability to evaluate the results of laboratory and instrumental research. Ability to perform sanitary and preventive measures. Ability to plan preventive and anti-epidemic measures against infectious diseases. Ability to process state, social, economic and medical information. Ability to assess the impact of socio-economic and biological determinants on the health of the individual, family, population. Ability to apply scientifically grounded psychological methods of effective work with colleagues, medical staff, patients and their relatives, readiness to interact with other people. Awareness of the individual in the field of culture of other people.

4. Prerequisites of the discipline

Successful training and mastering of competencies in the discipline "Clinical Microbiology" is based on the knowledge gained in the study of these disciplines:

1. Medical biology
2. Histology, cytology and embryology
3. Biophysics
4. Biochemistry
5. Normal physiology
6. Pathological physiology
7. Pathological anatomy

5. Program results of study

List of the results of study

Code of the result of study	Content of the result of study	Link to the code in the matrix of competencies
Kn-1 Ab-1	Ability to analyze the biological properties of opportunistic pathogens, patterns of their interaction with the macroorganism and the environment.	PW-2; PW-25
Kn-2 Ab-2	Ability to analyze the epidemiology and pathogenesis of nosocomial infections	PW-2
Kn-3	The ability to interpret the role of the normal microflora of the human body	PW-2
C-1	Ability to determine methods of microbiological diagnosis of opportunistic infections	PW-3
C-2	Ability to determine the means of etiologic therapy and prevention of diseases caused by opportunistic pathogens.	PW-6; PW-25

6. Discipline format and scope

Discipline format (<i>full-time / part-time</i>)	Format - full-time. 3.0 ECTS credits, 90 hours, are allocated for the study of the academic discipline.	
Type of classes	Number of hours	Number of groups
Lectures	10 hrs	1
Practical classes	10 hrs	1
Self - educational works	70 hrs	1

7. Topics and scope of the discipline

Code of the class type	Topic	Scope of study	Code of the result of study	Teaching staff
L-1	General information about	Methods of	Kn-1	

	clinical microbiology. Biological features of opportunistic microorganisms and diseases they cause.	educational and cognitive activities: explanatory-illustrative method, method of problem statement. Lectures include the study of morphology, physiology, pathogenicity factors and antigenic structure of opportunistic pathogens; causes of resistance of opportunistic pathogens to antimicrobials and ways to overcome them.		
L-2	Features of microbiological diagnosis of nosocomial infections. Methods of identification of hospital strains.		Kn-1, C-1	
L-3	Etiology, epidemiology, pathogenesis and clinic of nosocomial infections. COVID-19 as a nosocomial infection.		Kn-2	
L-4	The main representatives of the biocenoses of the human body. Dysbiosis, methods of microbiological diagnosis.		Kn-3	
L-5	Microbiological diagnosis of exogenous opportunistic infections		C-1	
Pc-1	Microbiological diagnosis of bacteremia and sepsis	Identification of opportunistic pathogens, analysis of the results of the study of their biological properties and the study of pathogenic factors. Study of the normal microflora of the human body.	Ab-2, C-1, C-2	
Pc-2	Microbiological diagnosis of urinary tract and genital infections		C-1, C-2	
Pc-3	Microbiological diagnosis of respiratory infections. Features of microbiological diagnostics of COVID-19.		Ab-2, C-1, C-2	
Pc-4	Microbiological diagnosis of intestinal infections and food poisoning		Ab-2, C-1, C-2	
Pc-5	Microbiological diagnosis of wound infection.		C-1, C-2	
Sew-1	Dysbacteriosis of the large intestine. Conditions of occurrence. Consequences of development. Correction methods.	Drawing up of schemes of diagnostics of opportunistic infections, definition of principles of etiotropic treatment and specific prevention. Compilation of an algorithm of actions in the diagnosis of internal nosocomial infection. Preparation for the license exam "Step-1". Analysis of cases that have a clinical focus, and their solution is based on knowledge and ability	Kn-3	
Sew-2	The problem of "healthy" carriers of opportunistic pathogens and remediation of bacteriocarriers.		Kn-3; Ab-2	
Sew-3	Exogenous opportunistic infections (legionellosis, pseudotuberculosis, listeriosis, seraciosis).		C-1, C-2	
Sew-4	Hospital strains and ecovars of opportunistic pathogens. Causes and ways to prevent their spread.		Kn-1, Kn-2	
Sew-5	Oral microflora and its role in human pathology		Kn-3	

		to interpret quantitative and qualitative data from the results of microbiological research.		
Sew -6	Microbiological diagnosis of meningitis		C-1, C-2	
Sew-7	Microbiological diagnosis of inflammatory processes of the eyes and ears		C-1, C-2	

8. Results of study verification

Current control

Assimilation of the topic is controlled in practical classes in accordance with specific goals. The control of practical skills is realized on the basis of manufacturing and research of microscopic preparations, definition of morpho - tinctorial, cultural, biochemical and antigenic properties of opportunistic pathogens, research of their pathogenicity factors, establishment of sensitivity to antimicrobial means, statement and interpretation of results of serological reactions. various clinical material. Assessment is carried out by the teacher's direct control of the student's performance of the skill, as well as with the use of illustrated tests.

At each practical lesson, students' knowledge is assessed according to a four-point system ("5", "4", "3", "2") according to the criteria for assessing the current activities of the student.

The calculation of the number of points for the current activity in general for the discipline is based on the student's marks on the traditional scale for each practical lesson during the study of the discipline, by calculating the arithmetic mean, rounded to two decimal places. The resulting value is converted into points on a multi-point scale as follows:

$$x = \frac{CA * 200}{5}$$

The minimum number of points that a student can score for the current activity in the study of the discipline is 120 points.

The maximum number of points that a student can score for the current activity in the study of the discipline is 200 points.

Assessment of student individual work

The material for individual work of students, which is provided in the topic of practical classes at the same time as classroom work, is evaluated during the current control of the topic in the relevant classroom.

Result of study code	Code of the class	Result of study verification method	Enrollment criteria
Kn-1, Ab - 1, Kn-2, Ab-2, Kn-3, C-1, C-2	Pc - 1- 5, Sew- 1- 7.	<p>For the current control of students' knowledge, test tasks have been created, which contain standard tests on the topic of the lesson (including tests with several correct answers), theoretical questions, which include questions from the lecture course and questions from self - work; cases (with 3 questions); practical skills according to the topic of the lesson.</p> <p>Evaluation of test tasks:</p> <p>Excellent ("5") - The student answers 90-100% of the tests correctly.</p> <p>Good ("4") - The student answered 71-89% of the tests correctly.</p> <p>Satisfactory ("3") - The student answered 60-70% of the tests correctly.</p> <p>Unsatisfactory ("2") - The student answered less than 60% of the tests.</p> <p>Unsatisfactory ("2") - The</p>	<p>Excellent ("5") - The student answers 90-100% of the tests correctly. Correctly, clearly, logically and fully answers all questions. Can closely connect theory and practice, correctly demonstrates the implementation of practical skills. Solves situational problems of increased complexity, is able to summarize the material, has research methods to the extent necessary for the activities of the doctor.</p> <p>Good ("4") - The student answered 71-89% of the tests correctly. Correctly and essentially answered the questions. Demonstrates practical skills. Correctly uses theoretical knowledge in solving practical problems. Is able to solve</p>

		<p>student answered less than 60% of the tests. Unsatisfactory (“2”) - The student answered less than 60% of the tests.</p> <p>Assessment of practical skills:</p> <p>"5" - demonstration of the skill is correct, complete;</p> <p>"4" - demonstration of skill with 2-3 minor errors;</p> <p>"3" - demonstration of skill with 1 significant, gross error or more than 3 minor errors.</p> <p>"2" - demonstration of the skill is completely wrong or with 2 or more gross errors.</p> <p>Evaluation of the theoretical question:</p> <p>"5" - the answer is correct, complete</p> <p>"4" - the answer is correct, incomplete</p> <p>"3" - the answer with errors, incomplete</p> <p>"2" - the answer is not in fact illogical</p> <p>Evaluation of the situational task:</p> <p>"5" - correct, complete answers to all questions</p> <p>"4" - correct, complete answers to two questions</p> <p>"3" - the correct, complete answer to one question</p> <p>"2" - answers to all questions are incorrect or missing.</p>	<p>easy and medium situational problems. Has the necessary practical skills and techniques to perform them in excess of the required minimum.</p> <p>Satisfactory (“3”) - The student answered 60-70% of the tests correctly. Incomplete, with the help of additional questions, answers questions. Cannot build a clear, logical answer on their own. During the answer and demonstration of practical skills the student makes mistakes. The student solves only the easiest problems, has only a mandatory minimum of research methods.</p> <p>Unsatisfactory (“2”) - The student answered less than 60% of the tests. Does not know the material of the current topic, cannot build a logical answer, does not answer additional questions, does not understand the material. Makes significant, gross mistakes when answering and demonstrating practical skills.</p>
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9. Policy of the discipline

Academic integrity. During the scientific and pedagogical process, students (applicants) and teachers are obliged to be guided by the Code of Academic Ethics of Danylo Halytsky Lviv National Medical University as a document that defines the standards of educational and scientific activities of higher education students and university staff generally accepted by the world community and creates an environment of intolerance to violations of academic integrity and ethics of academic relations. <https://nauka.meduniv.lviv.ua/wp-content/uploads/kodeks-akademichnoyi-etiki-2021.pdf> The educational process is organized on the basis of a credit transfer system with the use of a rating assessment of student performance. Unacceptable: cheating and plagiarism; absences and lateness to classes; use of a mobile phone, tablet or other mobile devices during classes (except as provided by the curriculum). plan and methodological recommendations of the teacher); untimely fulfillment of tasks set by the teacher during the current, final control of knowledge, as well as independent student work. Detecting signs of academic dishonesty in a student's work is grounds for the teacher not to accept it, regardless of the extent of plagiarism or cheating.

https://nauka.meduniv.lviv.ua/wpcontent/uploads/2019/11/plagiat_viyavlennya-ta-sanktsiyi-dlya-zdobuvachiv.pdf No form of violation of academic integrity will be tolerated. In the event of such events, the response is in accordance with the Code <https://nauka.meduniv.lviv.ua/wp-content/uploads/kodeksakademichnoyi-etiki-2021.pdf> Appeal procedure and algorithm The applicant has the right to familiarize himself/herself with the results of his/her examination (test) written work no later than 2 working days after writing it and to receive explanations for the grade received. In case of violations of the procedure, disagreement with the grade, the applicant has the right to file a written appeal to the head of the department, stating the specific reasons for disagreement with the grade. The appeal procedure and evaluation rules and procedures are described in detail in the Regulations on the Criteria for Evaluation Rules and Procedures. An appeal against the results of the final control of knowledge of higher education students is a component of the organizational support of the educational process, which is carried out to determine the objectivity of the grade. The main task of the appeal procedure is to overcome the elements of subjectivity in the assessment of knowledge, to avoid misunderstandings and disputes, to create the most favorable conditions for the development and realization of the legitimate rights and interests of the student. The head of the department, together with the examiner, involving other specialists, forms a commission to consider the issue of compliance with the procedure and within three working days ensures the consideration of the appeal and orally informs the student of the results of the consideration. In case of confirmation of the circumstances set forth in the application of the student, a new control measure with a different composition of the commission is carried out by order of the rector (vice-rector for scientific and pedagogical work).

10. Literature

Basic literature :

1. Medical microbiology, virology and immunology = a textbook for English – speaking students of higher medical schools: translation from ukr. Published / [T.V. Andrianova, V.V. Bobyr, V.V. Danyleichenko, etc.]; Ed. By V.P. Shyrobokov. – Vinnytsia: Nova Knyha, 2019. – 744p. :ill.
2. Medical Microbiology : A Guide to Microbial Infections: Pathogenesis, Immunity, Laboratory Investigation and Control, Edited by Michael R. Barer , Will L Irving, Elsevier Health Sciences 19th Revised edition, 2018
3. ISE Prescott's Microbiology
By Joanne Willey , Kathleen Sandman , Dorothy Wood 11th edition, 2019
4. Ananthanarayan and Paniker's Textbook of Microbiology Tenth edition, The Orient Blackswan, 2017)

Links to professional periodicals:

1. https://fems-microbiology.org/about_fems/network-and-activities/journals/
2. <https://elibrary.escmid.org/> ; <https://www.escmid.org/escmid-publications/manual-of-microbiology>
3. <https://asm.org/a/Microcosm-Digital-Magazine>
4. Microbiological Journal <https://microbiolj.org.ua/ua/archiv>
5. World of Medicine and Biology <https://womab.com.ua/ua/arcive>
6. Microbiology and Biotechnology <http://mbt.onu.edu.ua/issue/archive>
7. Regulatory mechanisms in Biosystems <https://medicine.dp.ua/index.php/med/issue/archive>

Additional literature

Review of Medical Microbiology and Immunology, 12edition/ Warren E. Levinson / McGraw-Hill Prof Med.-Tech., 2012. – 688 p.

1. Jawetz, Melnick, & Adelberg's Medical Microbiology, 26th Edition, 2012, English. – 880 p. – ISBN-13: 978-0071790314
2. Atlas R. M. Principles of microbiology.-McGraw-Hill, Boston, Massachusetts, 2001
3. Microbiology and immunology on-line <http://www.microbiologybook.org/>
4. On-line microbiology note <http://www.microbiologyinfo.com/>
5. Centers for diseases control and prevention www.cdc.gov

11. Equipment, logistical and software of the discipline/ course

Internet access

Panasonic multimedia interactive projector - available, commissioned in 2013

TVs - 2 pcs.

Luminescent microscope LUMAM R-8

MBI-6 (900213) - № 1

Autoclave

Dry oven

Refrigerators

Analytical scales

VLR-200 - №1,

Thermostat TS-80 M - № 5

Dispensers 10-1000,0 µl from 3 sq.m. 2016 - № 4,

Petri dishes, bacteriological loops, tweezers

Disks with antibiotics - №50

Measuring utensils

Nutrient media Endo, KA, IPA, BCH, JSA, Saburo.

Burners

12. Additional information

Lectures and practical classes are held at: Lviv, st. Zelena, 12.

Responsible for the educational process at the department - Assoc. prof. Shykula R.G

Responsible for the scientific circle of the department - Assoc. Panas M

Students are allowed to practice only in a medical gown, hat and change of shoes.

Syllabus compiler:

ass. Hural AR

Head of Department:
MD

Korniychuk OP, prof.