

SYLLABUS

The cycle of instruction 2019-2025 [INT]

Module/course name:	Medical Microbiology	Module code	LK.3C.002
Faculty:	I Faculty of Medicine with Dentistry Division II Faculty of Medicine with English Division		
Major:	Medical		
Specialty:			
Level of study:	I (Bachelor studies) <input type="checkbox"/> II (Master studies) <input type="checkbox"/> integrated Master studies X III (Doctoral studies) <input type="checkbox"/>		
Mode of study :	full-time X		
Year of study:	I <input type="checkbox"/> II X III <input type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI <input type="checkbox"/> Semester :	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 X 4 X 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/>	
Module/course type:	obligatory X elective <input type="checkbox"/>		
Language of instruction:	Polish <input type="checkbox"/> English X		
Form of education	Hours		
Lecture	20		
Seminar			
Laboratory class	50		
E-learning			
Practical class			
Internship			
Other			
Student's work input (participation in class, preparation, evaluation, etc.)	Student's hourly workload		
1. In class	70		
2. Student's own work	80		
Summary of the student's workload	150		
ECTS points for module/course	6		

Educational objectives:

Microbiology course provides an in-depth introduction to the epidemiology, etiology and pathogenesis of human infectious diseases for medical students. The course covers both the basic and clinical aspects of bacteriology, virology, and mycology. The course also covers principle issues concerning the diagnosis, treatment and prevention of infectious diseases.

The goal of the course is to provide the student with up-to-date, accurate, theoretical and practical knowledge in terms of medically important aspects of microbiology.

The course is presented as a balanced combination of lectures and laboratory classes throughout two semesters. The didactic portion is divided into four consecutive blocks of instruction.

The first block covers the basic principles of microbiology including microbial classification, taxonomy,

structure, physiology and genetics. It also covers essential approaches to microbial control including the decontamination methods, administration of antibiotics and chemotherapeutic agents. The pathogenesis of infectious diseases and epidemiological concepts are also discussed.

The second block expands on the general considerations given in the first block and leads into a detailed discussion of medical bacteriology and mycology. The epidemiology, symptomatology, pathogenesis, laboratory diagnosis, and therapy of the major bacterial and fungal pathogens are covered.

In the third block, the unique biological features of viruses are discussed as are the special procedures involved in diagnosis and therapy of viral infections. Individual representatives of the major viral groups are discussed in terms of epidemiology, symptomatology, pathogenesis, laboratory diagnosis, and therapy.

In the final block the role of bacterial, fungal and viral pathogens in different localized and systemic infections is discussed, along with the problem of their diagnosis, treatment and prevention.

The laboratory portion of the course includes an overview of laboratory methods used in the diagnosis of infectious diseases. The student gains practical knowledge in terms of diagnostic microbiology. Laboratory work includes the application of staining techniques and microscopy, isolation and identification of infectious agents cultured from clinical specimens as well as determination of microbial sensitivity to therapeutic agents. Rapid diagnostic methods such as immunofluorescence, ELISA, and PCR are also presented.

Students take partial tests after every block of instruction. The whole course ends in a final test.

Upon completion of the course the student will understand clinical application of microbiology to infectious diseases. The student will understand epidemiology, symptomatology and pathogenesis of infectious diseases. The student will also know diagnostic methods and principles of therapy of infections caused by the most important bacterial, viral and fungal pathogens.

The matrix of learning outcomes for module/ subject with reference to verification methods of the intended educational outcomes and forms of instruction:

Learning outcome code	A student who has obtained a credit for the module/course has the knowledge/skill to:	Methods of verifying the achievement of the intended learning outcomes:	Form of instruction * provide the symbol
W01 (C.W11.)	knows genetic mechanisms of drug-resistance developed by microbes and cancer cells;	written exam - MCQ - matching test - true/false test	Lecture/ Lab class
W02 (C.W12.)	classifies microbes with respect to pathogenic and those present in the normal flora;	written exam - MCQ - matching test - true/false test	Lecture/ Lab class
W03 (C.W13.)	knows the epidemiology of viral, bacterial, fungal and parasitic infections with respect to their geographical range of occurrence;	written exam - MCQ - matching test - true/false test	Lecture/ Lab class
W04 (C.W14.)	knows the effect of abiotic and biotic (viruses, bacteria) environmental factors on human body and human population and their entrance paths to the human body; can describe the consequences of human body exposure to various chemical and biological factors and the principles of prophylactics;	written exam - MCQ - matching test - true/false test	Lecture/ Lab class

W05 (C.W16)	knows the invasive forms or development stages of some parasitic fungi, protozoa, helminths and arthropoda, with respect to geographical range of their existence;	written exam - MCQ - matching test - true/false test	Lecture/lab class
W06 (C.W18)	recognizes symptoms of iatrogenic infections, their paths of spread, and pathogens responsible for changes in respective organs;	written exam - MCQ - matching test - true/false test	Lecture/ Lab class
W07 (C.W19)	knows and understands the basics of microbiological and parasitological diagnostics;	written exam - MCQ - matching test - true/false test	Lecture/ Lab class
W08 (C.W20)	knows the basics of disinfection, sterilization and aseptic procedures;	written exam - MCQ - matching test - true/false test	Lecture/ Lab class
U01 (C.U8.)	makes use of the antigen-antibody reaction in current modifications and techniques for diagnostics of infectious, allergic, autoimmune, blood and malignant diseases;	- completion of a given assignment - project - presentation	Lecture/ Lab class
U02 (C.U9.)	can make a preparation and identify pathogens under a microscope;	- completion of a given assignment - project - presentation	Lecture/ Lab class
U03 (C.U10.)	interprets the results of microbiological tests;	- completion of a given assignment - project - presentation	Lecture/ Lab class
U04 (C.U12.)	analyses the reactive, defense and adaptation response and control disorders caused by an etiological factor;	- completion of a given assignment - project - presentation	Lecture/ Lab class
U05 (C.U15.)	develops a schedule of rational, empirical or targeted chemotherapy of infections;	- completion of a given assignment - project - presentation	Lecture/ Lab class
K 01	cooperates with a group of colleagues/physicians and other staff members;	-an extended observation by a supervisor/tutor - 60-degree assessment (feedback from teachers)	Lecture/ Lab class
K 02	observes the rules of asepsis and antisepsis.	-an extended observation by a supervisor/tutor - 60-degree assessment (feedback from teachers)	Lecture/Lab class

L- LECTURES; LC – LABORATORY CLASSES

EXAMPLES OF METHODS VERIFYING THE ACHIEVEMENT OF THE INTENDED LEARNING OUTCOMES:

In terms of knowledge: Oral exam (*non-standardized, standardized, traditional, problem-based*).

Written exam – the student produces/identifies answers (*essay, report; structured short-answer questions /SSQ/; multiple choice questions /MCQ/; multiple response questions /MRQ/; matching test; true/false test; open cloze test*).

In terms of skills: practical exam; Objective Structured Clinical Examination /OSCE/; Mini-CEX (mini – clinical examination); completion of a given assignment; project, presentation.

In terms of social competences:

A reflective essay; an extended observation by a supervisor/tutor; 360-degree assessment (feedback from teachers, peers, patients, other co-workers); self-assessment (portfolio included).

Course content: (use keywords referring to the content of each class following the intended learning outcomes):

Lectures:

1. **The history and scope of microbiology. Characterisation and classification of microorganisms.** Morphology of bacteria. Structure of bacterial cells. Microbial taxonomy (classification, nomenclature, identification). Structure, morphology and function of bacterial cell.
2. **Determinants of bacterial pathogenicity. Host defences. Normal flora.** Attributes of bacterial pathogenicity (confounding the immune system, exotoxins, endotoxin, damage caused by inflammation and immune response). Immune response to bacterial, viral and fungal pathogens. Normal human flora (role of the normal flora, medically important members of the normal flora and their anatomic locations).
3. **Bacterial genetics. Bacterial resistance to drugs. Side effects of antibiotics' use.** Bacterial genetics (nucleic acid structure and organization, gene exchange and genetic diversity). Mechanisms of antibiotic resistance. Side effects of antibiotics' use.
4. **Vaccination.** Principles of vaccination. Active immunity. Passive immunity. Passive-active immunity. Types and examples of bacterial and viral vaccines.
5. **Basic Virology.** Viral structure, classification, replication. Classification of Medically important viruses (principles of classification; DNA viruses; RNA viruses). Pathogenesis of viral infection. Host defenses (nonspecific defenses; specific defenses). Laboratory diagnosis. Antiviral drugs and resistance.
6. **Upper and lower respiratory tract infections.** Classification of upper respiratory tract infections. Clinical features, common etiologic agents. Diagnostic approaches and principles of treatment. Classification, clinical features and etiology of lower respiratory tract infections. Diagnostic approaches and principles of treatment.
7. **Urinary tract infections. Sexually transmitted diseases and genital infections.** Classification, epidemiology and pathogenesis of genitourinary tract infections. Etiologic agents of genitourinary tract infections. Clinical manifestations, diagnosis, treatment and prevention of genitourinary tract infections.
8. **Bacteremia. Skin and soft tissue infections.** The definition and classification of bacteremia. Intravascular infections (endocarditis, thrombophlebitis, intravenous catheter bacteremia) and bacteremia from extravascular infections – pathogenesis, etiologic agents, diagnostic approaches, principles of management. Sepsis and septic shock – pathogenesis, clinical manifestations. Blood culture – principles of blood culture sampling and laboratory processing. Classification, epidemiology and pathogenesis of skin and soft tissue infections. Etiologic agents of skin and soft tissue infections. Clinical manifestations, diagnosis, treatment and prevention of skin and soft tissue infections.
9. **Gastrointestinal infections and food poisoning.** Common etiologic agents in gastrointestinal tract infections (bacteria and viruses). Pathogenesis of gastrointestinal infections (host and microbial factors). Classification of diarrheal infections. Epidemiologic settings (endemic infections, epidemic infections, traveler's diarrhea). Bacterial food-borne intoxications: agents, reservoirs, clinical manifestations, diagnosis. Laboratory investigations in diarrheal patients.
10. **Infections of the central nervous system. Infections in immunocompromised patients.** Routes of infection. Common causes of purulent CNS infections. Primary acute viral infections of the CNS. Clinical features. Common etiologic agents. General diagnostic approaches. Infections in immunocompromised patients. Classification of infections in immunocompromised patients. Factors predisposing to infections. Opportunistic pathogens (bacterial and fungal). Epidemiology. Prevention of infection. Diagnosis of opportunistic infections.

Laboratory class:

1. **Principles of microbiological diagnostics. Microscopic observation of microorganisms.** Principles and applications of light microscopy, dark-field microscopy, and fluorescence microscopy. Staining

- techniques: simple staining, (positive and negative staining), differential staining (Gram staining, acid-fast staining, capsule staining); hanging-drop preparations
2. **Bacterial metabolism. The cultivation of bacteria. Cultural characteristics of bacteria.** Bacteriological media. Laboratory diagnosis – introduction. Bacterial metabolism; composition of bacteria; physical and environmental requirements for microbial growth; collecting and transporting clinical specimens for microbiological evaluation; steps in microbiological diagnosis; growth of bacteria in the laboratory; types and characterization of growth media; non-cultural diagnostic methods.
 3. **Sterilization and disinfection.** Principles of sterilization and disinfection. Physical and chemical methods of decontamination.
 4. **Antimicrobial drugs. Principles of antimicrobial therapy.** Classification of antibacterial and antifungal drugs. Mechanisms of action of antimicrobial drugs. Antibiotic sensitivity testing (diffusion, dilution tests).
 5. **Drug resistance and alert pathogens.** Principles and mechanisms of antibiotic resistance. Genetic basis of resistance. Discussion on the most important resistance phenotypes identified among medically important microorganisms.
 6. **GENERAL BACTERIOLOGY TEST**
 7. **Gram- positive cocci.** Classification and characterization of medically important Gram-positive cocci – *Staphylococcus aureus*, coagulase-negative staphylococci, group A streptococci (*Streptococcus pyogenes*), group B streptococci (*Streptococcus agalactiae*), group D streptococci (enterococci, *Streptococcus bovis*), *Streptococcus pneumoniae*, viridans streptococci. Virulence factors produced by the bacteria. Transmission, epidemiology, pathogenesis and clinical manifestations of infections caused by Gram-positive cocci. Laboratory diagnosis, treatment and prevention of infections caused by Gram-positive cocci.
 8. **Gram-negative cocci. Spore-forming and non-spore-forming Gram-positive rods.** Classification and characterization of medically important Gram-negative cocci (*Neisseria gonorrhoeae*, *Neisseria meningitidis*), non-spore-forming Gram-positive rods (*Corynebacterium diphtheriae*, *Listeria monocytogenes*), and spore-forming rods (*Bacillus anthracis*, *Bacillus cereus*, *Clostridium botulinum*, *Clostridium tetani*, *Clostridium perfringens*, *Clostridium difficile*). Virulence factors produced by the bacteria. Transmission, epidemiology, pathogenesis and clinical manifestations of infections. Laboratory diagnosis, treatment and prevention of infections caused by Gram-negative cocci, spore-forming and non-spore-forming Gram-positive rods.
 9. **Gram-negative rods related to the enteric tract.** Natural defenses of the gastrointestinal tract. Primary pathogens and opportunistic pathogens among *Enterobacteriaceae* family. Antigenic structure of *Enterobacteriaceae*. Microbiological characteristics of *Enterobacteriaceae* (gram reaction, oxidase reaction, glucose and lactose fermentation). *E.coli*, *Shigella*, *Salmonella*, *Klebsiella*, *Vibrio*, *Proteus*, *Yersinia enterocolitica* and *Y. pseudotuberculosis*, *Campylobacter*, *Helicobacter pylori*, *Pseudomonas* (microbiology and cultural characteristics, epidemiology, virulence determinants, pathogenesis, clinical features, microbiological diagnosis, prevention)
 10. **Gram-negative rods related to the respiratory tract.** Classification and characterization of medically important Gram-negative rods related to the respiratory tract – *Haemophilus spp.* (*Haemophilus influenzae*, *Haemophilus parainfluenzae*), *Bordetella* sp.. (*Bordetella pertussis*, *Bordetella parapertussis*, *Bordetella bronchiseptica*), *Legionella pneumophila*. Virulence factors produced by the bacteria. Transmission, epidemiology, pathogenesis and clinical manifestations of infections. Laboratory diagnosis, treatment and prevention of infections caused by Gram-negative rods related to the respiratory tract.
 11. **CLINICAL BACTERIOLOGY (PART I) TEST**
 12. **Mycobacteria.** General characteristics of *Mycobacterium* species. *Mycobacterium tuberculosis* (bacteriology; epidemiology; pathogenesis; immunity). Tuberculosis: clinical aspects (manifestations of primary and reactivation tuberculosis; laboratory diagnosis; treatment; prevention). Mycobacteria causing tuberculosis-like diseases (*M. kansasii*, *M. avium-intracellulare* complex)
 13. **Spirochetes. Actinomycetes.** Classification and characterization of medically important spirochetes – *Treponema pallidum*, *Borrelia burgdorferi*, *Borrelia recurrentis*, *Borrelia hermsii*, *Leptospira interrogans*. Classification and characterization of medically important actinomycetes – *Actinomyces israelii*, *Nocardia asteroides*, *Nocardia brasiliensis*. Virulence factors produced by the bacteria. Transmission, epidemiology, pathogenesis and clinical manifestations of infections. Laboratory diagnosis, treatment and prevention of infections caused by spirochetes and actinomycetes.
 14. **Gram-negative rods related to animal sources (zoonotic organisms).** Classification and characterization of medically important zoonotic organisms (*Brucella spp.*, *Francisella tularensis*, *Yersinia pestis*, *Pasteurella multocida*, *Bartonella henselae*). Virulence factors produced by the bacteria,

- source of human infection, mode of transmission from animal to human, epidemiology, pathogenesis and clinical manifestations of infections, laboratory diagnosis, treatment and prevention
- 15. Basic Mycology.** Overview of fungi. Cell structure of fungi. Types of fungal diseases. Fungal morphology. Diagnosis of fungal infections.
- 16. Cutaneous and Subcutaneous Mycoses. Systemic Mycoses. Opportunistic Mycoses.** Cutaneous and subcutaneous mycoses (microbiology and cultural characteristics, epidemiology, pathogenesis, clinical features, microbiological diagnosis, prevention). Dimorphic fungi and opportunistic fungi (classification, risk factors, epidemiology, clinical features, diagnosis, prevention).
- 17. Mycoplasmas. Chlamydiae. Rickettsiae. Minor Bacterial Pathogens.** Classification and characterization of medically important mycoplasmas (*Mycoplasma pneumoniae*, *Mycoplasma hominis*, *Mycoplasma genitalium*, *Ureaplasma urealyticum*), chlamydiae (*Chlamydia trachomatis*, *Chlamydophila pneumoniae*, *Chlamydophila psittaci*), and rickettsiae (*Rickettsia rickettsii*, *Rickettsia prowazekii*, *Coxiella burnetii*). Virulence factors produced by the bacteria. Transmission, epidemiology, pathogenesis and clinical manifestations of infections. Laboratory diagnosis, treatment and prevention of infections. Characterization of clinical significance of minor bacterial pathogens (*Acinetobacter*, *Anaplasma*, *Bartonella*, *Moraxella*, *Citrobacter*, *Corynebacterium jeikeium*, *Corynebacterium minutissimum*, *Ehrlichia*, *Erysipelothrix*, *Fusobacterium*, *Gardnerella*, *HACEK group*, *Haemophilus aegyptius*, *Haemophilus ducreyi*, *Mobiluncus*, *Peptococcus*, *Peptostreptococcus*, *Propionibacterium*, *Pseudomonas pseudomallei*).
- 18. CLINICAL BACTERIOLOGY (PART II)+ MYCOLOGY TEST**
- 19. DNA enveloped viruses. DNA Nonenveloped Viruses.** DNA enveloped viruses: Herpesviruses (*HSV 1 and 2; VZV, CMV, EBV*). DNA nonenveloped viruses (*Adenoviruses*, *Papillomaviruses*, *Parvoviruses*, *Polyomaviruses*): diseases; important properties; replicative cycle; transmission and epidemiology; pathogenesis and immunity; clinical findings; laboratory diagnosis; treatment and prevention.
- 20. RNA Viruses** (*Orthomyxoviruses*, *Paramyxoviruses*, *Togaviruses*, *SARS*, *Coronavirus*, *Picornaviruses*, *Flavivirus - ZIKA*): diseases; important properties; replicative cycle; transmission and epidemiology; pathogenesis and immunity; clinical findings; laboratory diagnosis; treatment and prevention.
- 21. Hepatitis viruses. Human Immunodeficiency Virus.** Hepatitis viruses (HAV, HBV, HCV, delta hepatitis, HEV): virology; epidemiology; pathogenesis; clinical aspects; laboratory diagnosis; treatment and prevention. HIV (diseases; important properties; replicative cycle; transmission and epidemiology; pathogenesis and immunity; clinical findings; laboratory diagnosis; treatment and prevention).
- 22. BASIC AND CLINICAL VIROLOGY TEST**
- 23. Direct microscopic visualization of the organism in specimens (sputum, pus, blood, cerebrospinal fluid).** The role of direct microscopic examination in the diagnosis of infectious diseases. Direct clinical samples. Lab-exercise: microscopic identification of bacteria in direct clinical samples,
- 24. PCR as a diagnostic technique.** Overview of molecular methods. Amplification methods – PCR-based (overview of PCR and derivations; extraction and denaturation of target nucleic acid; extent of primer-target duplex; detection of PCR products). Lab exercise: self-performance of PCR reaction steps.
- 25. Specimens for microbiological examination. Diagnostic bacteriology review.** Clinical specimens management (general concepts for specimen collection and handling. Specimen workup). Lab-exercise: clinical case-based identification of microorganism.

CLINICAL CASE QUESTIONS TEST

Obligatory literature for lectures and labs:

1. W. Levinson "Review of Medical Microbiology and Immunology" 14th edition, Copyright © 2016 by McGraw-Hill Education, ISBN 978-0-07-184574-8
2. K. J. Ryan, C. G. Ray "Sherris Medical Microbiology", 6th Edition Copyright © 2014 by McGraw-Hill Education, Inc. ISBN 9780-0-7-181821-6

Complementary literature for lectures and labs:

1. R. A. Harvey, C. N. Cornelissen, B. D. Fisher "Microbiology" (Lippincott's Illustrated Reviews) 3rd edition (2013) Lippincott Williams & Wilkins; ISBN: 978-0-7817-8215-9
2. M. Gladwin, B. Trattler "Clinical Microbiology Made Ridiculously Simple" 5th Edition (2011) MedMaster Inc., ISBN: 978-0-940780-81-1.
3. S. H. Gillespie, K. B. Bamford „Medical Microbiology and Infection at a Glance" 4th Edition (2012) Wiley-Blackwell; ISBN: 978-0-470-65571-9

Requirements for didactic aids (multimedia projector, movie camera, etc.)

1. Lab-room designed to conduct microbiology classes (equipped with sink, light microscopes, burners, loops, an incubator, refrigerator, TV set).
2. Equipment necessary for microbial cultivation, characterization and identification: sterile swabs, microscopic slides, dyes, ready-made microscopic preparations, bacteriological media, biochemical tests to identify bacterial species, serological tests, antibiograms.
3. Some lab classes take place in the molecular diagnostics laboratory, equipped with the necessary equipment (eg. thermocycler, electrophoresis tanks, UV light transilluminator, camera).
4. Some lab classes take place in the microscopy room equipped with fluorescence microscope, phase-contrast microscope and dark-field microscope.
5. Multimedia projector, notebook.

Conditions for obtaining a credit for the subject:

1. Presence on lab classes.

Presence at lab-classes is obligatory. Students are allowed to have one unexcused lab-class absence during the whole course. Any other absences have to be excused. The excuses must be provided as soon as possible after being absent, since students who have unexcused absences at lab-classes are not allowed to take partial and final exams. Every absent lab-class material must be passed theoretically, students have to obtain the credit from the professor running the lab-class before the partial test including the given material is taken. Students are obliged to participate in lab-classes according to the schedule i.e. together with groups to which they have been assigned by the Dean's office. If there are any problems with attending the lab-class according to the curriculum, student has to contact the professor running the given lab-class and ask about the possibilities to come with another group at least one day before the given lab-class. Lab-classes and lectures start punctually. Students who are late are not allowed to participate in lab-classes.

2. The importance of obeying safety rules:

A clean white lab coat must be worn at all times. The coat should be removed at all times when leaving the laboratory.

3. Active participation in lab classes.

Students are expected to be prepared to and actively participate in lab-classes. Students are obliged to receive a credit for each lab-class which is required to be allowed to take each partial test. There are different forms of getting the credits depending on the topic of the lab-class including: active participation, quizzes, lab exercises, and case history-based presentations.

4. PARTIAL TESTS

After having finished every block of instructions students are required to take partial tests checking their knowledge in the particular subjects.

There are 5 partial tests:

- a) General Bacteriology
- b) Clinical Bacteriology (part I)
- c) Clinical Bacteriology (part II) and Mycology
- d) Basic and Clinical Virology
- e) Clinical Case Questions.

Two tests are taken in the first semester, next three - in the second semester. Any information presented in lectures, lab-classes, or the required readings may appear on examinations.

All "A" partial tests consist of 40 questions. Students obtain 1 point for each correctly answered question. To pass the test, students should correctly answer 60% of questions

„A” partial tests’ grading scale:

0-23 points (less than 60%):	2.0 (fail)
24-27 points (60-69%):	3.0 (pass)
28-31 points (70-79%):	3.5 (good enough)
32-35 points (80-89%):	4.0 (good)
36-37 points (90-94%):	4.5 (better than good)
38-40 points (95-100%):	5.0 (very good)

Students who did not pass "A" (first attempt) partial test can take "B" and "C"(second and third attempts) tests. "B" and "C" partials have a written form (30 multiple choice questions).

„B” and “C” partial tests’ grading scale:

0-17 points (less than 60%):	2.0 (fail)
18-20 points (60-69%):	3.0 (pass)
21-23 points (70-79%):	3.5 (good enough)
24-26 points (80-89%):	4.0 (good)
27-28 points (90-94%):	4.5 (better than good)
29-30 points (95-100%):	5.0 (very good)

Students who did not pass the previous test are not allowed to take the next one, even if they have obtained credits for all preceding lab-classes. In such a case they obtain the fail grade. All partials must be passed before the final examination. Presence at "A" partial tests is obligatory. Students who are absent at "A" partial tests obtain the fail grade.

5. FINAL EXAM

Only students who finished the whole course of Medical Microbiology and passed all partial tests can take the final examination. Students who have unexcused absences at lab-classes are not allowed to take the final exam.

Those who did not pass all partial tests before the date of examination, lose the opportunity to take it and obtain the fail grade. Students who did not pass "A" exam, can take "B" or "C" examination. Presence at "A", "B" and "C" exams is obligatory. The "A" examination test consists of 80 multiple choice questions, covering all topics of the program. Students obtain 1 point for each correct answer. To pass the examination, students should correctly answer 60% of questions.

"A" final exam's grading scale:

0-47 points (less than 60%):	2.0 (fail)
48-55 points (60-69%):	3.0 (pass)
56-63 points (70-79%):	3.5 (good enough)
64-71 points (80- 89%):	4.0 (good)
72-75 points (90-94%):	4.5 (better than good)
76-80 points (95-100%):	5.0 (very good)

"B" and "C" finals have a written form (50 multiple choice questions)

The "B" and "C" final exams' grading scale

0-29 points (less than 60%):	2.0 (fail)
30-34 points (60-69%):	3.0 (pass)
35-39 points (70-79%):	3.5 (good enough)
40-44 points (80- 89%):	4.0 (good)
45-47 points (90-94%):	4.5 (better than good)
48-50 points (95-100%):	5.0 (very good)

MISSED FINAL EXAM/ MAKE-UP POLICY: Student who is absent with no excuse obtains the fail grade. The student may be allowed to take the make-up examination under the following circumstances:

- Absence is due to serious illness/hospitalization of the student or an immediate family member. Documentation by a health care provider will be required at the time the student requests a make-up exam for the day of illness.
- Absence is due to family emergency, verified by a note from the professional person in attendance.
- Absence is due to a death in the immediate family. Documentation will be required.

To be eligible for the make-up exam under the above circumstances, the student must notify their coordinator within 3 working days.

ASSESSMENT

Students who have worked carefully during the whole course and have got good grades from the partials can obtain extra points added to the final exam grade, that may increase their final score.

Extra points are added to the final grade of "A" exam according to the following criteria:

- The average from all partial tests; $4.5=1$ extra -point
- The average from all partial tests; $4.6-4.7=2$ extra -points

- The average from all partial tests; 4.8-4.9 = 3 extra -points
- The average from all partial tests; 5.0= 4 extra -points

The student has the right to have an insight into his/her paper within 7 days from the release of the examination results.

The name and address of the department/clinic, where the course is taught (module/course); contact details (phone number/ email address):

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Signature of the head of the department/clinic

Dean's signature

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