Appendix number 1.5 to The Rector UR Resolution No. 7/2023

SYLLABUS

CONCERNING THE CYCLE OF EDUCATION **2024-2030**

ACADEMIC YEAR 2025/26

1.1. BASIC INFORMATION CONCERNING THIS SUBJECT / MODULE

Subject / Module	**Microbiology with parasitology**
Course code / module *	**Mb/C**
Name of the institution leading the course	**Faculty of Medicine**
Department Name	**Department of Microbiology**
Field of study	**medical direction**
Level of education	**uniform master's studies**
Profile	**general academic profile**
Form of study	**stationary / extramural**
Year and semester	**year II, semester III and IV**
Type of course	**obligatory**
Coordinator	**Assoc. Prof. Dominika Giżycka, PhD, MD**
First and Last Name of the Teacher	**Assoc. Prof. Dominika Giżycka, PhD, MD** **Karolina Maternia – Dudzik M.Sc.**

* - According to the resolutions of the Faculty of Medicine

1.2. Forms of classes, number of hours and ECTS

Semester No.	Lecture	Exercise	Conversation	Laboratory	Seminar	ZP	Practical	Self-learning	**Number of points ECTS**
III	12	29							5
IV	18	24			12				3

1.3. The form of class activities

☒classes are in the traditional form

☐classes are implemented using methods and techniques of distance learning

1.4. Examination Forms / module (**exam**, credit with grade or credit without grade)

Lectures, classes, seminars - credit with grade including: student's skills, attendance, grades from partial tests and final test.

2. REQUIREMENTS

Knowledge of biology and chemistry at the extended level.

3. OBJECTIVES, OUTCOMES, AND PROGRAM CONTENT USED IN TEACHING METHODS

3.1. Objectives of this course/module

C1	To familiarize students with microorganisms constituting the physiological flora, as well as pathogens causing infections.
C2	To familiarize students with current knowledge about methods of identification and microbial differentiation (microscopy, culture techniques, serological methods, molecular biology methods).
C3	To familiarize students with methods of determining bacterial susceptibility to antibiotics and chemotherapeutics in accordance with current recommendations.
C4	To familiarize students with the main groups of antibiotics, the mechanisms of bacterial resistance to antibiotics and methods of detection.
C5	To familiarize students with the issues of virological and parasitic infections.
C6	To familiarize students with the issues of systemic infections.
C7	To familiarize students with the methods of preventing and fighting infections – disinfection, sterilization, asepsis, antibiotic therapy, vaccinations.

3.2 OUTCOMES FOR THE COURSE / MODULE (TO BE COMPLETED BY THE COORDINATOR)

EK (the effect of education)	The content of the learning effect defined for the subject (module)	Reference to directional effects (KEK)
EK_01	The student knows the genetic mechanisms of the drug resistance acquisition by microorganisms.	C.W.11
EK_02	The student classifies germs, including pathogens and is able to explain the role of bacteria present in physiological flora.	C.W.12
EK_03	The student knows the epidemiology of infections with viruses, bacteria, fungi and parasitic infections, taking into account the geographical range of their occurrence	C.W.13
EK_04	The student knows the impact of abiotic and biotic (viruses, bacteria) environmental factors on the human body and population of people and the ways of their penetration into the human body;	C.W.14
EK_05	The student describes the consequences of exposure of the human body to various chemical and biological agents and principles of prophylaxis	C.W.14
EK_06	The student knows invasive forms or stages of selected parasitic protozoa, helminths and arthropods. He knows the geographical range of their occurrence.	C.W.16
EK_07	The student discusses the principle of the parasite-host system and knows thebasic disease symptoms caused by parasites	C.W.17
EK_08	The student knows the symptoms of iatrogenic infections, the ways of theirspread and pathogens causing changes in individual organs	C.W.18
EK_09	The student knows and understands the basics of microbiological andparasitological diagnostics	C.W.19
EK_10	The student knows the basics of disinfection, sterilization and aseptic.	C.W.20
EK_11	The student knows the problem of drug resistance, including multidrug-resistance.	C.W.40
EK_12	The student evaluates environmental hazards and uses basic methods to detect the presence of harmful (biological and chemical) factors in the biosphere	C.U.6

EK_13	The student recognizes the most common human parasites on the basis of their structure, life cycles and disease symptoms	C.U.7
EK_14	The student uses serological methods to diagnose infectious diseases	C.U.8
EK_15	The student can prepare a preparation directly from clinical and breeding material, can recognize basic microbes under a microscope	C.U.9
EK_16	The student interprets the results of microbiological tests	C.U.10
EK_17	The student is able to propose rational empirical and targeted antibiotic therapy for infections.	C.U.15
EK_18	The student perceives and recognizes his/her own limitations and self-assesses educational deficits and needs.	K.5
EK_19	The student is ready to formulate conclusions from his or her own measurements or observations.	K.8
EK_20	The student is ready to take responsibility related to decisions made in the course of professional activity, including in terms of safety of themselves and others.	K.11

3.3 CONTENT CURRICULUM (filled by the coordinator)

A. Lectures

Course contents - semester III (12 h)
1. The history and scope of medical microbiology. General characteristic and classification of cellular and acellular microorganisms (e.g. bacteria, fungi, viruses, prions). Structure of bacterial cells.
2. Bacterial metabolism. Bacterial genetics.
3. Determinants of bacterial pathogenicity. Mechanisms of bacterial infections. Virulence factors, toxins. Biofilm – definition, functions.
4. Antimicrobials and chemotherapeutics. Main groups, mechanism of action and spectrum.
5. Antiviral drugs, antifungal drugs.
6. Mechanisms of bacterial resistance to antibiotics.
Course contents - semester IV (18 h)
1. Gram-positive bacteria: classification, characteristics, and pathogenicity.
2. Gram-positive bacteria: classification, characteristics, and pathogenicity.
3. Gram-negative bacteria: classification, characteristics, and pathogenicity.
4. Gram-negative bacteria: classification, characteristics, and pathogenicity.
5. Anaerobic bacteria: classification, characteristics, and pathogenicity.
6. Atypical bacteria: classification, characteristics, and pathogenicity.
7. Medical important viruses: classification, characteristics and pathogenesis of infections. Antiviral drugs. Prions as an etiological agents of infective diseases.
8. Medical important fungi: classification, characteristics and pathogenesis of infections. Classification of human mycoses. Antifungal drugs.
9. Basic parasitology. Classification, characteristics and parasites life cycles. Pathogenesis of infections.

B. Problems of laboratory exercises, practical classes

Course contents - semester III
Ex. 1 (4 h) - Organizational exercise. Safety and hygiene in microbiological laboratory. Selected staining techniques: Gram staining, capsule-staining, acid-fast staining. Bacterial morphology under the microscope.
Ex. 2 (4 h) - Basic of bacterial cultures. Culture media, isolation and cultivation of aerobic bacteria. Morphology of bacterial colony.
Ex. 3 (3 h) - Methods of antibiotic susceptibility testing.
Ex. 4 (4 h) - Bacterial resistance to antibiotics: mechanisms of resistance, methods for detection, interpretation of the results.
Ex. 5 (3 h) - Gram-positive bacteria (*Staphylococcus, Streptococcus, Enteroccocus*) – culture and identification methods.
Ex. 6 (3 h) - Gram-negative rods (glucose-fermentative and non-fermentative) – culture and identification methods.
Ex. 7 (4 h) - Anaerobes. Microaerophilic and capnophilic bacteria – culture and identification methods.
Ex. 8 (4 h) - Medical important fungi - diagnostic methods of infections caused by yeasts, mainly *Candida* spp, diagnostic methods of infections caused by dermatophytes, moulds.
Course contents - semester IV
Ex. 1 (3 h) - Microbiological diagnostic of respiratory tract infections (including cases).
Ex. 2 (3 h) - Microbiological diagnostic of bloodstream infections (including cases). Microbiological diagnostic of OUN tract infections (including cases).
Ex. 3 (3 h) - Microbiological diagnostic of urinary tract infections (including cases). Sexually transmitted diseases and genital infections (including cases).
Ex. 4 (3 h) - Microbiological diagnostic of gastrointestinal infections (including cases).
Ex. 5 (3 h) - Microbiological diagnostic of skin and soft tissue infections (including cases).
Ex. 6 (3 h) - Parasite infections diagnostic. Part 1 Protozoa of the gastrointestinal tract and genitourinary system. Collection of clinical materials, methods of diagnosis and identification of protozoa. Microscopic observations of specimens of selected protozoa. Part 2 Protozoa parasitizing in the blood and organs of the genus: Trypanosoma, Leishmania, Babesia, Plasmodium. Free-living protozoa. Diagnostic materials, test methods. Microscopic observations of selected protozoa.
Ex. 7 (3 h) - Parasite infections diagnostics. Part 3 Flukes and tapeworms. Diagnostic methods used in identification. Direct preparations from feces, microscopic preparations of selected protozoa. Part 4 Nematodes and ectoparasites. Diagnostic methods used in identification, research methods. Microscopic observations of preparations of selected protozoa.
Ex. 8 (3 h) - Practical colloquium. Verification of theoretical and practical knowledge regarding the above-mentioned classes, taking into account the ability to prepare and evaluate preparations, culture, mechanisms of resistance to antibiotics, interpretation of antibiograms.

C. Seminar

Course contents of the seminar - semester IV (12 h)
Sem. 1 (2 h) - Methods of sterilization and disinfection. Asepsis and antisepsis.
Sem. 2 (2 h) - Methods of molecular biology in microbiological diagnostics.
Sem. 3 (2 h) - Hospital infections. Prophylaxis of hospital infections. Epidemiological investigation. Hand care and hygiene in laboratory and hospital.
Sem. 4 (2 h) - Laboratory diagnostics of viral infections. Diagnostics of infection caused by mycobacteria and actinomycetes.
Sem. 5 (2 h) - Basics of infectious immunology.
Sem 6 (2h) – The human microbiome.

3.4 TEACHING METHODS

Lecture: Lecture with multimedia presentation, distance learning methods.

Laboratory exercises: Practical microbiological culture of clinical materials, microscopic slides, collection of clinical materials for microbiological tests. Presentation of microorganisms culture, culture media, methods of microbiological diagnostics (phenotypical, serological, molecular), antibiograms, mechanisms of bacterial resistance to antibiotics. Analysis of clinical cases with discussion, group work (solving tasks, discussion), practical performance of tasks presented in the content of the laboratory exercises. Interpretation of microbiological test reports. Introduction to the exercises in the from of a lecture with a multimedia presentation, during which the issues presented during the exercises are discussed in details.

Seminars: The aim of the seminar is a lecture with a multimedia presentation, as well as a discussion, methods of distance learning, by means of which the student receives extended knowledge in the field of medical microbiology.

4 METHODS AND EVALUATION CRITERIA

4.1 Methods of verification of learning outcomes

Symbol of effect	Methods of assessment of learning outcomes (Eg.: tests, oral exams, written exams, project reports, observations during classes)	Form of classes
EK_ 01-09	Written colloquium, laboratory reports, observation during classes, written exam	Lectures, Exercise, Seminars
EK_10	Practical pass, laboratory reports, observation during classes	Exercise
EK_ 11-15	Written colloquium, laboratory reports, observation during classes, written exam	Lectures, Exercise, Seminars

4.2. Conditions for completing the course (evaluation criteria)

General rules:

1 The basis for passing is attendance at exercises, seminars and lectures.
2 Passing the exercises – passing all written and test colloquia and practical colloquium for a positive assessment. Positive assessment from laboratory reports.
3 Passing seminars – passing colloquia for a positive assessment.
4 Passing lectures - passing colloquia for a positive assessment.
4 Passing the course – receiving a positive grade from the FINAL EXAM. Passing the test exam is at least sufficient. A student who scores at least 60% points on the test receives a positive grade.
5. Any objections regarding credit or exam questions will only be considered if the student raises them with the instructor immediately after the completion of the credit test or exam.

Exercises, seminars, lectures:

The final grade from laboratory exercises is the average grade from all colloquia after completing thematic blocks, practical colloquium and successfully passed reports from exercises. In addition, during the exercises, the student may receive a positive or negative grade for his activity and knowledge in a direct conversation with the teacher laboratory classes. Students are informed about the substantive content of the exercises 2 weeks before the start of laboratory classes.
The final grade of the seminar is the average grade from all colloquia after the completed thematic blocks implemented as part of the seminar.

Detailed conditions for obtaining credit for laboratory exercises, seminars:

1. Presentation of reports from the practical part of the exercises within a deadline of 5 working days after the end of the exercise – reports must be submitted once (all exercise groups leave a report at the Department of Microbiology at one time). Positive assessment of the report (+), negative assessment (-). In the case of receiving a negative grade, the student is obliged to make corrections and present a corrected report during subsequent exercises.
2. The condition for passing the entire semester of laboratory classes is to receive positive assessments for all reports and colloquia.
3. Attendance at all classes, lectures and seminars is mandatory. In case of unexcused absence students should made up classes, lectures and seminars with another laboratory group.
4. The student must first agree with the teacher on the possibility of doing classes in another group (too large group of students is unacceptable)!
5. The student must first agree with the teacher on the possibility of making up the lecture.
6. Two unexcused absences do not allow the student to take part in the examination session!
7. The student has the right to one correction term for each of the colloquia scheduled during the semester.
8. During classes, lectures and seminars, unannounced written or oral checks on students' preparation in relation to the substantive content of the classes are allowed. In such a case, the student receives a grade on a scale (2.0 - 5.0), which is taken into account in the average final grade.
9. In the case of failing a partial colloquium, the final grade is awarded for the colloquia for the entire semester, covering all thematic blocks carried out as part of classes and/or seminars in a given semester.
10. If a student receives an unsatisfactory grade, the student has the right to apply to the authorities of the Institute of Medical Sciences for a board examination.

General rules:

1 The basis for passing is attendance at exercises, seminars and lectures.
2 Passing the exercises – passing all written and test colloquia and practical colloquium for a positive assessment. Positive assessment from laboratory reports.
3 Passing seminars – passing colloquia for a positive assessment.
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Examination:

1. Test exam with closed, single- and multiple-choice questions.
2. Students have two exam dates: the first (basic) and the second (correction) term.
3. Unexcused absence from the exam results in receiving an unsatisfactory grade.
4. The final grade for the course is the exam grade. Score range: 2.0 – 5.0

Knowledge assessment:
5.0 - has knowledge of each of the education content at the level of 93% -100%
4.5 - has knowledge of each of the content of education at the level of 85% -92%
4.0 - has knowledge of each of the education content at the level of 77% -84%
3.5 - has knowledge of each of the content of education at the level of 69% -76%
3.0 - has knowledge of each of the content of education at the level of 60% -68%
2.0 - has knowledge of each of the contents of education below 60%

Skill assessment:
5.0 - the student actively participates in classes, recognizes and is able to properly name biological phenomena in the human body, and to assess the microbiological regularities of thefunctioning of the human body. Skillfully uses basic laboratory techniques,

4.5 - the student actively participates in the classes, with little help from the teacher recognizes and is able to properly name biological phenomena in the human body, and to assess the microbiological regularities of the functioning of the human body. He uses basictechniques well

4.0 - the student actively participates in classes, with minor corrections of the teacher, committing minor mistakes in the recognition of microbial phenomena in the human body. Heuses laboratory techniques well

3.5 - the student participates in classes, with numerous corrections and teacher's instructions
recognizes and is able to correctly name microbiological phenomena in the human body, often making mistakes while using laboratory techniques

2.0 - the student passively participates in classes, commits blatant errors in the diagnosis and proper naming of microbiological phenomena, unskilfully uses laboratory techniques, committing many errors and many times.

5. Total student workload required to achieve the desired result in hours and ECTS credits

Activity	Hours / student work
Hours of classes according to plan with the teacher	95
Others with the participation of an academic teacher (participation in consultations, examination)	5
Non-contact hours - student's own work (preparation for classes, exams, writing a report, etc.)	150
SUM OF HOURS	250
TOTAL NUMBER OF ECTS	8

6. TRAINING PRACTICES IN THE SUBJECT / MODUL

Number of hours	-
Rules and forms of apprenticeship	-

6. LITERATURE

Basic literature:

1. Murray PR, Rosenthal KS, Pfaller MA: Medical Microbiology. 9th Edition, Elsevier 2020
2. W. Levinson "Review of Medical Microbiology and Immunology", 16th Edition, 2020

Additional literature:

1. M. Gladwin, B. Trattler "Clinical Microbiology Made Ridiculously Simple", 7th Edition, MedMaster, Miami, 2019

Acceptance Unit Manager or authorized person