Appendix number 1.5 to The Rector UR Resolution No. *12/2019*

SYLLABUS

concerning the cycle of education 2019-2025

Academic year 2020/2021

1. BASIC INFORMATION CONCERNING THIS SUBJECT

Subject	Microbiology with parasitology
Course code *	Mb/C
Faculty of (name of the leading direction)	Faculty of Medicine, University of Rzeszow
Department Name	Department of Microbiology
Field of study	Medical direction
level of education	uniform master's studies
Profile	General academic
Form of study	stationary / extramural
Year and semester	year II, semesters 3 and 4
Type of course	Obligatory
Language	English
Coordinator	dr n. med. Dominika Giżycka
First and Last Name of the Teachers	dr n. med. Dominika Giżycka

* **- According to the resolutions of Educational Unit**

1.1. Forms of classes, number of hours and ECTS

Semester No.	Lecture	Exercise	Conversation	Laboratory	Seminar	ZP	Praktical	Other	**Number of points ECTS**
3	14	21			14				9
4	16	24			6				

1.2. The form of class activities

☒ classes are in the traditional form

☒ classes are implemented using methods and techniques of distance learning

1.3 Examination Forms (exam, credit with grade or credit without grade)

Lectures, exercises, seminars - credit with grade including: attendance, grades from partial tests and final test.

2.BASIC 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

C1	Knowledge to classify bacteria, viruses, fungi and parasites taking into account their pathogenicity and microbiological diagnostics.
C2	Understanding the mechanisms of interaction in the microbial-host system.
C3	Knowledge to diagnosis of etiopathogenesis and epidemiology of infective diseases.
C4	Knowledge with disinfection, antiseptic and sterilization processes and the aseptic in the aspects of the safety and of the problem of nosocomial infections.
C5	Acquainting with the possibilities of prophylaxis and treatment of infectious diseases. Knowledge on the correct selection of antibiotics and other antimicrobial compounds depending on the microorganism's type and sensitivity. Teaching the principles of the rational chemotherapy
C6	Knowledge of diagnostic procedures in bacterial, viral and fungal infections and the ability to use this knowledge to appropriate interpretation of results of the microbiological diagnostic
C7	Knowledge of diagnostic procedures in parasitic infections and the ability to use this knowledge to appropriate interpretation of results of the microbiological diagnostic

3.2 OUTCOMES FOR THE COURSE

EK (the effect of education)	The content of learning outcomes defined for the class (module)	Reference to directional effects [1]
EK_01	The Student classifies germs, including pathogens and is able to explain the role of microorganisms living in the microbiota in various healthy state or infecting sensitive organisms	C.W.12
EK_02	The Student can prepare a preparation directly from clinical and breeding material, can recognize basic microbes under a microscope techniques, and have a knowledge about phenotypic methods including the biochemical, serogical and molecular methods useful during microbials identification and classification	C.W.13.
EK_03	The Student knows the epidemiology of infections with viruses, bacteria, fungi and parasitic infections, taking into account the geographical regions and range of their occurrence.	C.W.14
EK_04	The Student knows the basics of disinfection, sterilization, antiseptic methods as well as aseptics importance; knows the basics of epidemiology of nosocomial infections.	C.W.19

[1] In the case of a path of education leading to obtaining teaching qualifications, also take into account the learning outcomes of the standards of education preparing for the teaching profession.

EK_05	The Student can evaluate environmental hazards and uses basic methods to detect the presence of harmful biological factors for the human. He/she has a knowledge about alert pathogens and negative consequences of the work with patients and in the hospital environment	C.U6
EK_06	The Student has knowledge about various infectious diseases based on the analysis of various infectious diseases and selected clinical cases, their symptoms connected with the etiological agents and therapeutic options , taking into account the risks.	C.U.9

3.3 CONTENT CURRICULUM

A. Problems of the lecture

Course contents	Hours 30
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 h
2. Bacterial metabolism. Bacterial genetics.	2 h
3. Determinants of bacterial pathogenicity. Mechanisms of bacterial infections. Virulence factors, toxins. Biofilm – definition, functions.	2 h
4. Antimicrobials and chemotherapeutics. Main groups, mechanism of action and spectrum.	2 h
5. Antimicrobials and chemotherapeutics. Main groups, mechanism of action and spectrum.	2 h
6. Methods of sterilization and disinfection. Asepsis and antisepsis.	2 h
7. Gram-positive bacteria: classification, characteristics, and pathogenicity.	2 h
8. Gram-positive bacteria: classification, characteristics, and pathogenicity.	2 h
9. Gram-negative bacteria: classification and characteristics, and pathogenicity.	2 h
10. Gram-negative bacteria: classification and characteristics, and pathogenicity.	2 h
11. Anaerobic bacteria: classification and characteristics, and pathogenicity.	2 h
12. Atypical bacteria: classification and characteristics, and pathogenicity.	2 h
13. Medical important viruses: classification, characteristics and pathogenesis of infections. Antiviral drugs. Prions as an etiological agents of infective diseases.	2 h
14. Medical important fungi: classification, characteristics and pathogenesis of infections. Classification of human mycoses.Antifungal drugs.	2 h
15. Basic parasitology. Classification, characteristics and parasites life cycles. Pathogenesis of infections.	2 h

B. Problems of exercises

Course contents	Hours 45

1. Organizational exercise. Safety and hygiene in microbiological laboratory. Selected staining techniques: Gram staining, capsule-staining, acid-fast staining. Bacterial morphology under the microscope.	3h
2. Basic of bacterial cultures. Culture media, isolation and cultivation of aerobic bacteria. Morphology of bacterial colony.	3h
3. Methods of antibiotic susceptibility testing	3h
4. Bacterial resistance to antibiotics: mechanisms of resistance, methods for detection, interpretation of the results.	3h
5. Sterilization and disinfection. Hand care and hygiene in laboratory and hospital.	3h
6. Gram-positive bacteria (*Staphylococcus, Streptococcus, Enteroccocus*) – culture and identification methods.	3h
7. Gram-negative rods (glucose-fermentative and non-fermentative) – culture and identification methods.	3h
8. Anaerobes. Microaerophilic and kapnofilic bacteria – culture and identification methods.	3h
9. Medical important fungi- diagnostic methods of infections caused by dermatophytes, moulds, and yeasts, mainly *Candida* spp.	3h
10. Laboratory diagnosis of viral infections.	3h
11. Parasite infections diagnostic.	3h
12. Microbiological diagnostic of gastrointestinal infections. Microbiological diagnostic of OUN tract infections.	3h
13. Microbiological diagnostic of bloodstream infections.	3h
14. Microbiological diagnostic of urinary tract infections. Sexually transmitted diseases and genital infections.	3h
15. Microbiological diagnostic of respiratory tract infections. Microbiological diagnostic of skin and soft tissue infections.	3h

C. Problems of Seminar

Course contents	Hours 20
1. Safety and hygiene in microbiological laboratory. Rules for working with infectious materials. Stains in microbiology.	2 h
2. Overview of methods (including phenotypic, genotypic, serological methods) used for bacterial identification.	2 h
3. Principles of rational antibiotic therapy.	2 h
4. Bacterial resistance to antibiotics - interpretation of the results. Multidrug resistance.	2 h
5. Microbiota	2 h
6. Rules for downloading and sending material for microbiological tests.	2 h

7. Hospital infections. Prophylaxis of hospital infections. Epidemiological investigation.	2 h
8. Basics of infectious immunology. Prevention and prophylaxis of infective diseases.	2 h
9. Medical important bacteria, viruses, fungi, parasites. (including cases)	2 h
10. Microbiological diagnostic of gastrointestinal infections. Microbiological diagnostic of OUN tract infections. Microbiological diagnostic of bloodstream infections. Microbiological diagnostic of urinary tract infections. Sexually transmitted diseases and genital infections. Microbiological diagnostic of respiratory tract infections. Microbiological diagnostic of skin and soft tissue infections. (including cases)	2 h

3.4 Didactic methods

Exercises: Analysis of laboratory tasks concerning selected medical cases with discussion. Practical tasks related to the implementation of microbiological diagnostics and results interpretation. Work in groups. Performing practical tasks. Interpretation of exemplary test reports.

Lecture: Lecture with multimedia presentation, distance learning methods

Seminars: Short problem lectures with discussion, distance learning methods. Student presentations.

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 -05	Written colloquium I - test Written colloquium II - test Written colloquium III - test Written colloquium IV – test Oral discussion observation during classes	Lectures, Exercises, Seminars
EK_ 06	Practical pass Exercise	Exercise

4.2 Conditions for completing the course (evaluation criteria)

Exercises: Full participation and activity in exercises. Theoretical preparation for classes (passing entrance tests; range of ratings: 2.0 - 5.0. Describing the results together with the conclusions in the positively evaluated report (range of ratings: 2.0 - 5.0). Passing the report is a necessary condition allowing for the next exercises. The final mark of the exercises is the average of the partial marks, i.e. from tests and the average grade from reports from the exercises. The student has the right to one repetition period for each of the tests.

Lectures/Seminars: Credit based on attendance and on an average of partial tests results. Credit of each semester based on an average of partial tests and activity and preparation for classes. In the case

of an unsatisfactory grade from the partial colloquium, the student has the right to one correction term. In the case of failing a partial colloquiums/tests, the Student is assessed at the end of the semester by means of grades of a comprehensive colloquium/test including themes from semester III or IV. The student has the right to two comprehensive tests. In the case of not receiving a positive grade, the student has the right to apply to the Dean with a request for a commission colloquium.

Examination:

The end exam after one-year course - test pass (50 questions) with closed, open and multiple-choice questions:

A: Questions in the field of messages to remember;
B: Questions in the field of speech to understand;
C: Solving a typical written task;
D: Solving a non-standard written task.
Duration of the test 50 minutes.

The condition for admission to the exam is a positive grade from the laboratory exercises (both semesters), credit from the seminar (both semesters), and from lectures (both semesters).

Students have two exam dates: the first and the second term.

The final grade is the grade from the exam.

Knowledge assessment:

Written test grades – the Student has knowledge of each of the education content at the level of:

93% -100%: 5.0
85% -92%: 4.5
77% -84%; 4.0
69% -76%: 3.5
60% -68%: 3.0
below 60%: 2.0

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 the functioning of the human body. Skillfully uses basic laboratory techniques and interpretative criteria,

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 basic techniques and interpretative criteria 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. He uses laboratory techniques well, rare making mistakes while using laboratory techniques and interpretative criteria 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 and interpretative criteria 2.0 - the Student passively participates in classes, commits blatant errors in the diagnosis and proper naming of microbiological phenomena, unskilfully uses laboratory techniques and interpretative criteria, committing many errors many times

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

Activity	**The average number of hours to complete the activity**
Contact hours (with the teacher) resulting from the study schedule of classes	95
Contact hours (with the teacher) participation in the consultations, exams	-
Non-contact hours - student's own work (preparation for classes, exam, writing a paper, etc.)	191
SUM OF HOURS	286
TOTAL NUMBER OF ECTS	9

** It should be taken into account that 1 ECTS point corresponds to 25-30 hours of total student workload.*

6. TRAINING PRACTICES IN THE SUBJECT

NUMBER OF HOURS	-
RULES AND FORMS OF APPRENTICESHIP	-

7. LITERATURE

Basic literature: Murray PR, Rosenthal KS, Pfaller MA: Medical Mikrobiology. 9th Edition, Elsevier 2020 W. Levinson “Review of Medical Microbiology and Immunology”, 16th Edition, 2020
Additional literature

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

Acceptance Unit Manager or authorized person