Microbiology

1. IMPRINT	
Academic Year	2024/2025
Department	Faculty of Medicine
Field of study	Medicine
Main scientific discipline *(in accord with appendix to the Regulation of Minister of Science and Higher educatio from 26th of July 2019)*	Medical sciences
Study Profile *(general academic / practical)*	General academic
Level of studies *(1st level /2nd level/ uniform MSc)*	Uniform MSc
Form of studies	Full time studies
Type of module / course *(obligatory / non-compulsory)*	Obligatory
Form of verification of learning outcomes *(exam / completion)*	Exam
Educational Unit / Educational Units *(and address / addresses of unit / units)*	Chair and Department of Medical Microbiology 5 Chałubińskiego Street 02-004 Warsaw, Poland (+48 22) 628 27 39 http://mikrobiologia.wum.edu.pl e-mail: mikrobiologia@wum.edu.pl

Head of Educational Unit / Heads of Educational Units	prof. dr hab. Hanna Pituch (e-mail: hanna.pituch@wum.edu.pl)
Course coordinator *(title, First Name, Last Name, contact)*	**dr n. med. Robert Kuthan, e-mail: robert.kuthan@wum.edu.pl**
Person responsible for syllabus *(First name, Last Name and contact for the person to whom any objections concerning syllabus should be reported)*	prof. dr hab. Hanna Pituch dr n. med. Robert Kuthan, **e-mail: robert.kuthan@wum.edu.pl**
Teachers	dr n. med. Robert Kuthan lek. Gabriel Zaremba-Wróblewski dr hab. n. med. Anna Henriques dos Santos de Sepulveda mgr biol. Kinga Markowska

2. BASIC INFORMATION

Year and semester of studies	III year, V and VI semester	**Number of ECTS credits**	6.00

FORMS OF CLASSES **Contacting hours with academic teacher**	**Number of hours**	**ECTS credits calculation**
Lecture (L)		
Seminar (S)	10	0.50
Classes (C)	70	3.50
e-learning (e-L)		
Practical classes (PC)		
Work placement (WP)		
Unassisted student's work		
Preparation for classes and completions	50	2.0

3. COURSE OBJECTIVES

O1	Students will learn about the classification of microorganisms, the general characteristics of bacteria, viruses and fungi, the pathogenicity of microorganisms, the physiological significance of human microbiota. They will learn about the epidemiology of infections, groups of antimicrobial drugs, mechanisms of antibiotic resistance and the principles of rational chemotherapy as well as composition and role of human microbiome.
O2	Familiarize students with the course of microbiological examinations, methods of recognizing infectious diseases, diagnostic algorithms, limitations of the diagnostic methods and tests used, causes of pre-laboratory errors and methods of determining sensitivity to antibiotics, antifungal drugs and antiviral drugs.

O3	Learning infection prevention methods such as: passive and active prevention, vaccination programs, hospital hygiene (disinfection, sterilization, aseptic procedures).
O4	Teach students how to perform basic laboratory activities, operate measuring devices and assess the accuracy of measurements performed, which are necessary for proper cooperation between the physician and microbiologist in diagnosing infectious diseases.

4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING *(concerns fields of study regulated by the Regulation of Minister of Science and Higher Education from 26 of July 2019; does not apply to other fields of study)*

Code and number of effect of learning in accordance with standards of learning *(in accordance with appendix to t Regulation of Minister of Science and Higher education from 26th July 2019)*	**Effects in time**
Knowledge – Graduate* knows and understands:	
G.K1/ C.W11	genetic mechanisms for the acquisition of drug resistance by microorganisms and tumor cells;
G.K2/ C.W12	classify microorganisms, with consideration of pathogenic and present in the physiological flora;
G.K3/ C.W13	epidemiology of infections with viruses and bacteria, fungi and parasites including geographical coverage of their distribution;
G.K4/ C.W14, C.W15	abiotic and biotic (viruses, bacteria) effects of the environmental factors on the human body and the population of people and the way of their entering the human body; consequences of exposure of the human body to various chemical and biological factors and the principle of prevention;
G.K5/ C.W16	invasive forms or developmental stages of selected parasitic fungi, protozoa, helminths, and arthropods, taking into account the geographical range of their occurrence;
G.K6/ C.W18	symptoms of iatrogenic infections, roads of their spread and pathogens causing changes in individual organs;
G.K7/ C.W19	basics of microbiological and parasitological diagnostics;
G.K8/ C.W20	basics of disinfection, sterilization and aseptic procedures;
G.K9/ C.W33	external and internal pathogens, modifiable and non-modifiable;
G.K10/ C.W40	understands the problem of drug resistance, including multi-drug resistance.
Skills– Graduate* is able to:	
G.S1/ C.U6	assesses environmental threats and uses basic methods allowing to detect the presence of harmful factors (biological and chemical) in the biosphere;
G.S2/ C.U9	formulates a microscopic preparation and recognizes pathogens under the microscope;
G.S3/ C.U10	interprets the result of microbiological tests;
G.S4/ C.U15	designs rational regiment of chemotherapy of infections, empirical and targeted;
G.S5/ B.U9	uses simple instruments measuring and assesses the accuracy of measurements

G.S6/ D.U17	critically analyzes medical literature, and draws conclusions.

** In appendix to the Regulation of Minister of Science and Higher education from 26th of July 2019 „graduate", not student is mentioned.*

5. ADDITIONAL EFFECTS OF LEARNING *(non-compulsory)*	
Number of effect of learning	**Effects of learning in time**
Knowledge – Graduate knows and understands:	
	not applicable
Skills– Graduate is able to:	
	not applicable
Social Competencies – Graduate is ready for:	
SC1. / K1	The graduate is aware of his own limitations and skills.
SC2. / K2	The graduate is able to use objective sources of information;

6. CLASSES

Form of class	**Class contents**	**Effects of Learning**
Classes	1. Pathogenic properties of microorganisms. The concept of microbiota and its role in human health. Basics of diagnosis of bacterial infections (culture and microscopic methods).	G.K2, G.K7, G.S1, G.S2 / CW. 12, C.W19, C.U6, C.U9
	2. Hospital hygiene. Sterilization and disinfection. Methods of air, surface and water purity control.	G.K8, G.S1, / C.W20, C.U6
	3. Gram-positive and Gram-negative cocci.	G.K2, G.K3, G.K4, G.K7, G.K9, G.S2, G.S5 / C.W12, C.W13, C.W14, C.W15, C.W19, C.W33, C.U9, B.U9
	4. Gram-negative bacilli.	G.K2, G.K3, G.K4, G.K7, G.K9, G.S2, G.S5 / C.W12, C.W13, C.W14, C.W15, C.W19, C.W33, C.U9, B.U9
	5. Strictly anaerobic bacteria.	G.K2, G.K3, G.K4, G.K7, G.K9, G.S2, G.S5 / C.W12, C.W13, C.W14, C.W15, C.W19, C.W33, C.U9, B.U9
	6. Gram-positive bacilli and Mycobacteria.	G.K2, G.K3, G.K4, G.K7, G.K9, G.K10, G.S2, G.S5 / C.W12, C.W13, C.W14, C.W15, C.W19, C.W33, C.W40, C.U9, B.U9
	7. Pathogenic fungi. Mycotoxins. Mycoallergens. Antifungal drugs.	G.K2, G.K3, G.K5, G.K7, G.S2, G.S5 / C.W12, C.W13, C.W16, C.W19, C.U9, B.U9
	8. Bacterial drug susceptibility testing. Bacterial resistance to antibiotics. Detection of mechanisms of resistance to antibiotics and chemotherapeutics. Principles of rational antibiotic therapy. Discussion of the result of the microbiological test.	G.K1, G.K10, G.S4, G.S5 / CW 11, CW40, C.U15, B.U9

	9. Viruses, general properties and methods of recognition of viral infections. Antiviral treatment.	G.K1, G.K3, G.K4, G.K6, G.K7 G.K8, G.K2, G.K3, G.S5, G.S6/ C.W 11, C.W13, C.W 14, C.W 15, C.W19, B.U9, D.U17
	10. DNA viruses.	G.K3, G.K4, G.K6, .S1, G.S6 / C.W13, C.W14, C.W15, C.W18, C.U6, D.U17
	11. RNA viruses. Diagnostics of HIV and hepatitis.	G.K3, G.K4, G.K6, G.S1, G.S6 / C.W13, C.W14,C.W15, C.W18, C.U6, D.U17
	12. Respiratory tract infections.	G.K6, G.K7, G.S1, G.S3, G.S4, G.S5 / C.W18, C.W19, C.U6, C.U10, C.U15, B.U9, K1
	13. Gastrointestinal tract infections.	G.K6, G.K7, G.S1, G.S2,G.S3, G.S4, G.S5 / C.W18, C.W19, C.U6, C.U9, C.U10, C.U15, B.U9, K1
	14. Urinary tract infections.	G.K6, G.K7, G.S1, G.S2, G.S3, G.S4, G.S5, / C.W18, C.W19, C.U6, C.U9, C.U10, C.U15, B.U9, K1
	15. Skin, wounds, bones and joints infections.	G.K6, G.K7, G.S1, G.S2, G.S3, G.S4, G.S5 / C.W18, C.W19, C.U6, C.U9, C.U10, C.U15, B.U9, K1
	16. Nervous system infections. Prion diseases.	G.K6, G.K7, G.S1, G.S2, G.S3, G.S4, G.S5 / C.W18, C.W19, C.U6, C.U9, C.U10, C.U15, B.U9, K1
	17. Bloodstream infection.	G.K6, G.K7, G.S1, G.S2, G.S3, G.S4, G.S5 / C.W18, C.W19, C.U6, C.U9, C.U10, C.U15, B.U9, K1
	18. Sexually transmitted microbes. Vertical and perinatal infections.	G.K3, G.K4, G.K6, G.K7, G.K9, G.S3, G.S6/ C.W13, C.W15, C.W18, C.W19, C.W33, C.U10, D.U17
Seminars	1. Atypical bacteria, intracellular, rickettsiae, spirochetes.	G.K3, G.K4, G.K7, G.S2, G.S5/ C.W13, C.W14, C.W19, C.U6, C.U10.
	2. Zoonotic infections. Bioterrorism.	G.K4, G.K6, G.S1/ C.W14, C.W15, C.W18, C.U17
	3. Infection prevention.	G.K3, G.K4, G.K6, G.S1, G.S5 / C.W13, C.W14, C.W15, C.U6, K1, K2
	4. Nosocomial infections.	G.S1, G.K9, G.K10, G.S1, G.S3, G.S4, G.S5 /C.W18, C.W33, C.W40, C.U10, C.U15, K1.

6. LITERATURE

Obligatory

1. **Medical Microbiology, P.R. Murray, K.S. Rosenthal and M.A. Pfaller. Elsevier. 9th ed. 2020.**
2. Textbook of Diagnostic Microbiology, C. R. Mahon, D. C. Lehman, 6th Ed., Elsevier 2019 or 7th Ed (2022).
3. Training materials provided by the Chair and Department of Medical Microbiology on the e-learning platform.

Supplementary

1. Medical Microbiology, Jawetz, Melnick, & Adelberg's Medical Microbiology, 28th ed. New York, McGraw-Hill, 2019.
2. The European Committee on Antimicrobial Susceptibility Testing – EUCAST - Guidelines and Rationale Documents. https://www.eucast.org/

7. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion

	Participation in classes	Verification of student's attendance and activity during classes
G.K1, G.K2, G.K3, G.K4, G.K5, G.K6, G.K7, G.K8, G.K9, G.K10, G.S1, G.S2, G.S3, G.S4, G.S5, G.S6 / C.W11, C.W12, C.W13, C.W14, C.W15, C.W16, C.W18, C.W19, C.W20, C.W33, C.W40, C.U6, C.U9 C.U10, C.U15, B.U9, D.U17, K1, K2	**Colloquium 1** Range of topics: classes 1 – 7; seminar 1 theoretical colloquium, written, 6 open questions. **Colloquium 2** Topics include: classes 8 - 11, theoretical colloquium, written, 5 open questions. Re-take colloquia (1 and 2) have an oral form, commission colloquia have a written form (works will be checked by 2 assistants). **Colloquium 3** Topics include: classes 12 -18, Seminar: 2-4 practical and oral colloquium, 3 tasks: 1. Preparation and discussion of microscopic preparations. 2. Discussion of the microbiological examination step. 3. Interpret the result of the diagnostic test. The amendment colloquium and the commission colloquium are oral.	The answer to each question is assessed on a scale of 0-6. The criterion for passing each colloquium (1-2) is to receive ≥ 50% points.
	Completion of tasks posted on the e-learning platform.	Each student is required to read at least 3 case reports and answer questions about microbiological diagnostics, treatment and/or prevention. The passing criterion is the confirmation of the task completion in the system.
	Observation of the student by the leading teacher.	Sufficient assimilation of learning outcomes in the field of knowledge, skills and competences.
	Final exam Date of exam: summer examination session. Number of questions: 80. Format of questions: MCQ. Duration: 80 min. Each question is rated on a point scale: 0 or 1. The passing criterion is to obtain >45 points (**>55%**). Any complaint to the examination questions must be written during or right after the exam, but before leaving the examination room. The complaint must include: student's name and/or index number, examination test version, question number, substantiation for the complaint. **Re-take of the Final exam** Date of exam: re-take examination session. Format of questions: Students will be informed about the date and form of the exam before the summer break.	Each question is graded on a point scale: 0 or 1. The criterion for passing is to obtain >45 points (>55%) fail = 2.0. (ndst) - 0-45 points satisfactory = 3.0, (dst) - 46-52 points better than satisfactory = 3.5, (ddb) - 53- 59 points good = 4.0, (db) - 60-66 points better than good = 4.5, (pdb) - 67-73 points very good = 5.0, (bdb) – 74-80 points

8. ADDITIONAL INFORMATION *(information essential for the course instructor that are not included in the other part of the course syllabus e.g. if the course is related to scientific research, detailed description of, information about the Science Club)*

Exercises and seminars take place in the Department of Medical Microbiology in the Prof. Edmund Mikulaszek Hall, Anatomicum building, second floor, 5 Chałubińskiego Street (corner of Oczki Street).

Detailed class regulations, credit criteria, and timetables can be found on the Department of Microbiology's website.

https://mikrobiologia.wum.edu.pl.

Didactic materials, information about class schedules, and announcements are published on the e-MUW platform.

https://e-learning.wum.edu.pl/course/view.php?id=5560.

The student is obliged to comply with the Regulations for the organization of didactic classes at the Department of Medical Microbiology and the Regulations of Studies and Examination of the Medical University of Warsaw.

The student is obliged to prepare theoretically for each subsequent class. It is allowed to check the preparation for the exercise and the seminar.

As a preparation for the classes, before each class student should read subject related chapter from one of the books listed in the section 7 – Obligatory literature.

The student is obliged to attend classes with his group (it is not possible to transfer to another group or do homework with another group, except for students studying according to the individual organization of studies (IOS).

Attendance at all exercises is mandatory.

Classes starts on time, any student who came late will not be allowed to enter the classroom. Being late to class by more than 15 minutes is counted as an absence from class.

All student absences from classes (also excused) should be made up. Making up for missed classes will be determined individually. The student is obliged to agree with the assistant conducting the classes on the mode, form, and date of making up for the exercise or seminar. The student is obliged to control his attendance.

Laboratory classes are composed of theoretical and practical parts, which both are obligatory to participated in. Seminars classes are compulsory to participated in.

The condition for admission to the exam is attendance at all classes and passing 3 colloquium tests.
Consequence of the commission colloquium failure: microbiology course not completed.

During classes it is necessary to have protective clothing (cotton apron).
The laboratory classes are organized as practical activities. Students will be working with infectious material, therefore the following rules have to be observed:

- *hands must be washed and/or disinfected after each class,*
- ***jewelry must be removed from hands/wrists for the time of classes,***
- ***long hair must be tied back***
- *outer coats must be left in the cloakroom downstairs,*
- *protective gowns must be used in the laboratory classroom (brought to the first laboratory class and stored at the Department of Medical Microbiology for the duration of the course),*
- *eating, drinking, smoking (incl. e-cigarettes) is strictly forbidden.*

The resit exam will take place in a resit session. Students will be informed about the date and form of the exam before the summer break.

Students have the opportunity to cooperate scientifically with the Department as part of the activities of Student Scientific Circles (SKN):
1. Microbiology Applied to Clinics and Real life for Students (MACR-S). Supervisors: Dr. Robert Kuthan (robert.kuthan@wum.edu.pl), Gabriel Zaremba-Wróblewski, M.D. (gabrielzaremba@gmail.com)
2.SKN Mycology "Mucor". Supervisor: Dr. Robert Kuthan (robert.kuthan@wum.edu.pl)

During the last classes in the summer semester, students have the opportunity to complete the Survey of Evaluation of Classes and Academic Teachers

ATTENTION

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers.