

DESCRIPTION OF THE COURSE OF STUDY

Course code	0912.4.LEK.C.Mi	
Name of the course in	polish	Mikrobiologia z parazytologią Microbiology with parasitology
	english	

1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

1.1. Field of study	Medicine
1.2. Mode of study	Full time
1.3. Level of study	Uniform Master's studies
1.4. Profile of study*	Practical
1.5. Person/s preparing the course description	prof. zw. dr hab. Robert Bucki
1.6. Contact	robert.bucki@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Language of instruction	English
2.2. Prerequisites*	anatomy, histology, physiology

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	lecture, classes, laboratories	
3.2. Place of classes	Lecture /Classes/Laboratories - Courses in the teaching rooms of JKU, e-learning platform	
3.3. Form of assessment	lecture – E, classes / laboratories – credit with grade	
3.4. Teaching methods	Practical classes, conversational lecture, discussion	
3.5. Bibliography	Required reading	1. Stefan Riedel, Stephen A. Morse, Timothy Mietzner, Steve Miller Jawetz, Melnick, & Adelberg's Medical Microbiology. 28th Edition. Lange Medical Books/McGraw-Hill, 2019 2. Burton J. Bogitsh, Clint E. Carter, Thomas N. Oeltmann. Human parasitology. 5th Edition. Elsevier Academic Press, 2019
	Further reading	1. Mark T. Gladwin, William Trattler, C. Scott Mahan. Clinical Microbiology Made Ridiculously Simple. 9th Edition in color. MedMaster, 2023 2. Buczek Alicja, Katarzyna Bartosik. Parasitology for medical students. 3rd Edition. Koliber, Lublin 2011

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED TEACHING OUTCOMES

4.1 .Course objectives (for all forms of the course)

Lectures

- Acquaintance with biological characteristics and classification of microorganisms.
- Knowing the morphology of bacteria, basics of genetics and physiology.
- Understanding antimicrobial defense mechanisms.
- Understanding of human microbiota.
- Acquaintance with basic microbial virulence factors.
- Knowing the basic characteristics and clinical significance of key bacterial groups, as well as mycobacteria, fungi and viruses causing infections in humans.
- Knowing the rational antibiotic therapy principles as well as strategy to seek novel therapeutics aimed at infection therapy.
- The basics of diagnostics and therapy of viral infections.
- Understanding of biology of selected human parasites.
- Knowing the anatomical and morphological structure of selected human parasites.
- Understanding the role that parasites play in humans and animals.
- The basics of diagnostics and therapy of parasitoses.
- Learning the methods to collect and store materials for diagnostics of parasitoses.

Classes

- Learning the basic methods used in microbiological diagnostics.
- Theoretical considerations concerning collection, storage and transport of microbiological material.
- Selection of microbiological/serological/molecular tests according to the type of infection and potential etiological factors.

- Learning the main groups of antibiotics (also: the most modern ones) and the mechanisms of action against bacterial / fungal cell.
- Learning the most clinically relevant mechanisms of bacterial drug resistance.
- Acquaintance with clinical forms, etiological factors and principles of treatment of: urinary tract infections; respiratory tract infections; gynecological infections; STDs; skin and soft tissue infections; bloodborne infections / endocarditis; bone and bone marrow infections; CNS infections.
- Learning the most common parasitoses in Poland / worldwide.
- Learning about uncommon / imported parasitoses in Poland.
- Learning about parasitic arthropods and arthropods acting as parasitic vectors.
- Learning of basic principles of parasitic diagnostics.

Laboratories

- Practical means of work with potentially infectious materials.
- Practical aspects of proper hand disinfection.
- Practical aspects of proper sampling, storage and transportation of material for microbiological examination.
- Identification of basic bacterial / fungal etiological factors (colony morphology on solid media, practical use of rapid preliminary diagnostic tests).
- Acquaintance with light microscopy, Gram-staining method as well as recognition of morphology of bacterial/ fungal cells in microscopy preparations.
- Practical aspects of diagnostics via bacterial culture, including the rules to culture of anaerobic bacteria.
- Practical aspects of mycological diagnostics (culture, serology).
- Learning the interpretation of simple microbiological test results as well as interpretation of clinically relevant drug resistance mechanisms.
- Recognition and analysis of selected parasites as well as structures characteristic of these parasites in microscopy preparations.
- Learning of basic techniques of parasitic diagnostics.

4.2. Detailed syllabus (for all forms of the course)

LECTURES:

Semester I - Winter

1. Basics of microbiology. Introduction to clinical microbiology
2. Basic antimicrobial defence mechanisms. Etiopathogenesis of infectious diseases. Human microbiota
3. General characteristics and clinical importance of selected groups of pathogenic bacteria, pt. I
4. General characteristics and clinical importance of selected groups of pathogenic bacteria, pt. II
5. Basics of mycology. Etiological factors of mycoses

Semester II – Summer

1. Introduction to antibiotics
2. Characteristics and significance of mycobacteria
3. Basics of virology. Viral etiological factors in humans, pt. I
4. Basics of virology. Viral etiological factors in humans, pt. II
5. Eye infections. Bone and joint infections. Perinatal infections
6. Strategies used to seek for novel antibiotics
7. Microbiology in clinical practise
8. Basic concepts of parasitology. Mechanism of parasitic pathogenicity. Epidemiology and prophylaxis of parasitosis. Medical parasitology of: gastrointestinal tract; urogenital tract; blood and tissues
9. Basic concepts of parasitology. Nomenclature, classification, and characteristics of human parasites. Pathophysiology of parasitic diseases. Parasitic infections of the gastrointestinal tract, genitourinary system, blood, and tissues
10. Detailed Parasitology – Tropical Parasites (Selected Disease Entities)
11. Detailed Parasitology – Protozoa
12. Detailed Parasitology – Arthropods (Arachnids and Insects)

CLASSES:

Semester I – Winter

1. Safety procedures in microbiology lab. Bacterial cell structure. Bacterial morphology. Methods for microbiological diagnostics – microscopy; cultures. Concepts of bacterial identification
2. Microbiological diagnostics in practice
3. Characteristics of selected G(+) bacteria (*Staphylococcus*, *Streptococcus*, *Enterococcus*, *Listeria*, *Corynebacterium*, *Bacillus*)
4. Characteristics of selected G(-) rods: *Enterobacterales*, *Vibrio*, *Aeromonas*, *Plesiomonas*, non-glucose-fermenting bacilli: *Pseudomonas*, *Acinetobacter*, *Burkholderia*, *Stenotrophomonas maltophilia*
5. Characteristics of selected G(-) cocci (*Neisseria*, *Moraxella*). Small G(-) rods: *Haemophilus*, *Bordetella*. Others: *Legionella pneumophila*. *Mycoplasma pneumoniae*, *Chlamydia*, *Chlamydophila*
6. Characteristics of selected anaerobes and actinomycetes: *Actinomyces*, *Nocardia*
7. Yeasts and molds. Diagnostics of mycoses. Antimycotics
8. COLLOQUIUM (microbiology)

Semester II – Summer

1. Antibiotics, pt. I
2. Antibiotics, pt. II
3. Clinically important drug resistance mechanisms, detection methods and clinical relevance
4. Upper and lower respiratory tract infections
5. Urinary tract infections
6. Gynecological tract infection – multibacterial vaginosis, trichomoniasis, candidiasis. STDs
7. Selected skin and soft tissue infections.
8. Bloodstream infection. Endocarditis.
9. Central nervous system infections.
10. Gastrointestinal tract infections. Food poisoning.
11. COLLOQUIUM (microbiology)
12. The most common helminths of Poland. Nematoda - Roundworms
13. Trematoda - Flukes
14. Cestoda – Tapeworms; parasites of intestines, tissues and organs

LABORATORIES:

Semester I – Winter

1. Proper hygienic hand washing/ disinfection procedure. Preparation of stained specimens. Rules of light microscopy. Microbial reduction inoculation on selected media (the streak plate method)
2. Media/ commercial tests used in microbiology – demonstration. The most common devices used in microbiology – demonstration
3. A demonstration of cultures of selected G(+) and G(-) bacteria on solid media – assesment of type of growth and colony morphology. Carrying out the selected identification tests for G(-) and G(+) bacteria
4. COLLOQUIUM (microbiology)
5. A demonstration of culture of selected anaerobic bacteria, assesment of microscopy samples, demonstration of commercial biochemical tests. Analysis of microbiological test results
6. Yeasts and molds. Classical mycosis diagnostics. Demonstration of cultures, assesment of microscopy samples, demonstration of commercial biochemical tests

Semester II– Summer

1. Methods for microbial susceptibility determination. Disk-diffusion method for making antibiograms of selected microorganisms
2. Test results assesment and interpretation of antibiograms for selected microorganisms. E-test results assesment and interpretation. Antibiograms with certain drug resistance mechanisms: ESBL, MRSA, VRE, MBL, KPC, others (demonstration, assesment, interpretation)
3. Upper and lower respiratory tract infections – sampling, sample refferal analysis, diagnostics, assesment of sample test results
4. COLLOQUIUM (microbiology)
5. Diagnostics of urinary tract infections and selected STDs. Urine sampling procedure using semi-quantitative method, urine sample culture assesment, bacteriuria level assesment, Gram-stained preparations assesment – for multibacterial vaginosis, gonorrhoea, vaginal candidiasis. Analysis of sample test results
6. Selected skin and soft tissue infections – sampling methods, diagnostics, sample test results assesment
7. Bloodborne infections diagnostics. CNS infections. Guidelines for blood and cerebrospinal fluid samples collection. Microscopy preparations examination. Sample test results assesment
8. Infectious diarrhea diagnostics. Rapid test for detection of *Clostridioides difficile*
9. PRACTICAL ASSESSMENT OF MICROBIOLOGY LABORATORY
10. Nematoda (Roundworms) – Diagnostics. Structure and lifie cycles of roundworms: human pinworm (*Enterobius vermicularis*), human roundworm (*Ascaris lumbricoides*), dog roundworm (*Toxocara canis*), cat roundworm (*Toxocara cati*), and whipworm (*Trichuris trichiura*).
11. Trematoda (Flukes) – Diagnostics. Morphological structure and developmental cycles of medically important digenean flukes (Digenea). Clinical symptoms of fluke infections and methods of prevention.
12. Cestoda (Tapeworms) – Diagnostics. Intestinal, tissue, and organ parasites. Morphological structure and developmental cycles of medically important tapeworms from the orders Pseudophyllidea and Cyclophyllidea. Clinical symptoms and prevention of tapeworm infections.
13. Protozoa – Parasites of the digestive and urogenital systems. Structure and development of selected protozoan species (intestinal, oral, and urogenital parasites). Arthropods (Arachnids and Insects). Recognition of morphological features and diagnostic symptoms. Role in the transmission of infectious and parasitic diseases.
14. COLLOQUIUM (Parasitology)
15. PRACTICAL ASSESSMENT OF PARASITOLOGY LABORATORY

4.1. Education outcomes in the discipline

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE :		
W01	the graduate knows and understands microorganisms, including pathogenic ones and those constituting the human microbiome, and forms or development stages of selected parasites that are invasive to humans;	C.W10.
W02	the graduate knows and understands the epidemiology of infections with viruses, bacteria, fungi, prions and parasites including geographical range of their occurrence;	C.W11.
W03	the graduate knows and understands pathogenesis and pathophysiology of infections and contagions and the impact of pathogenic factors such as viruses, bacteria, fungi, prions and parasites, on the human body and population, including their methods impacts, consequences of exposure and principles of prevention;	C.W12.
W04	the graduate knows and understands the implications of the human body exposure to chemical and physical factors and prevention principles;	C.W13.

W05	the graduate knows and understands etiology, pathogenesis, pathophysiology, transmission routes, forms and prevention of iatrogenic infections;	C.W14
W06	the graduate knows and understands methods used in microbiological and parasitological diagnostics (indications, principles of conducting, interpretation of the result);	C.W15.
W07	the graduate knows and understands principles of disinfection, sterilization and aseptic procedures;	C.W17.
W08	the graduate knows and understands the problem of drug resistance, including multi-drug resistance and principles of rational antibiotic therapy;	C.W32.
W09	the graduate knows and understands environmental and epidemiological determinants, causes, symptoms, principles of diagnosing and therapeutic as well as preventive management of the most common infectious diseases and their complications: 1. Bacterial diseases, including streptococcal, staphylococcal, pneumococcal, and meningococcal infections, whooping cough, tuberculosis, Lyme disease, and gastrointestinal infections; 2. Viral diseases, including respiratory and gastrointestinal tract infections, viral hepatitis, Herpesviridae infections, human immunodeficiency virus, and neurotropic viruses; 3. Parasitic diseases, including giardiasis, amoebiasis, toxoplasmosis, malaria, toxocariasis, trichinosis, ascariasis, tapeworm infections, and enterobiasis; 4. Fungal infections, including candidiasis, aspergillosis, and pneumocystosis; 5. Hospital-acquired infections;	E.W33.
within the scope of ABILITIES:		
U01	the graduate knows how to operate the optical microscope, also making use of immersion;	A.U1.
U02	the graduate knows how to recognize pathogens under a microscope;	C.U5.
U03	the graduate knows how to interpret the results of microbiological tests;	C.U6.
within the scope of SOCIAL COMPETENCE:		
K01	the graduate is able to recognize his/her own limitations and self-evaluate educational deficiencies and needs;	K.S5.
K02	the graduate is able to use reliable information sources;	K.S7.
K03	the graduate is able to conclude on the basis of own surveys and observations;	K.S8.
K04	the graduate is able to introduce rules of social conduct and teamwork to the group of specialists, including specialists from other medical professions also in the multicultural and multinational environment;	K.S9.
K05	the graduate is able to give opinions concerning various aspects of professional activity;	K.S10.
K06	the graduate is able to take responsibility for own decisions made during professional activities including own safety and safety of other people;	K.S11.

4.4. Methods of assessment of the intended teaching outcomes

Teaching outcomes (code)	Method of assessment (+/-)																				
	Exam oral/written*			Test*			Project*			Effort in class*			Self-study*			Group works*			Othersq*		
	Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes		
	W	C	...	W	C	...	W	C	...	W	C	...	W	C	...	W	C	...	W	C	...
W01	+				+																
W02	+				+																
W03	+				+																
W04	+				+																
W05	+				+																
W06	+				+																
W07	+				+																
W08	+				+																
W09	+				+																
U01											+			+			+				
U02											+			+			+				

U03										+			+			+			
K01-K06																		+	

**delete as appropriate*

4.5. Criteria of assessment of the intended teaching outcomes		
Form of classes	Grade	Criterion of assessment
lecture (W)	3	61-68% Mastering the content of the curriculum at the basic level, chaotic answers, necessary leading questions.
	3,5	69-76% Mastering the content of the curriculum at the basic level, systematized answers, requires the teacher's help.
	4	77-84% Mastering the content of the curriculum at the basic level, systematic and independent answers. Problem solving in typical situations.
	4,5	85-92% The scope of the presented knowledge goes beyond the basic level based on the supplementary literature provided. Problem solving in new and complex situations.
	5	93% -100% The scope of the presented knowledge exceeds the basic level based on self-acquired scientific sources of information
classes (C)	3	61-68% Mastering the content of the curriculum at the basic level, chaotic answers, necessary leading questions.
	3,5	69-76% Mastering the content of the curriculum at the basic level, systematized answers, requires the teacher's help.
	4	77-84% Mastering the content of the curriculum at the basic level, systematic and independent answers. Problem solving in typical situations.
	4,5	85-92% The scope of the presented knowledge goes beyond the basic level based on the supplementary literature provided. Problem solving in new and complex situations.
	5	93% -100% The scope of the presented knowledge exceeds the basic level based on self-acquired scientific sources of information
Laboratories (L)	3	61-68% Mastering the content of the curriculum at the basic level, chaotic answers, necessary leading questions.
	3,5	69-76% Mastering the content of the curriculum at the basic level, systematized answers, requires the teacher's help.
	4	77-84% Mastering the content of the curriculum at the basic level, systematic and independent answers. Problem solving in typical situations.
	4,5	85-92% The scope of the presented knowledge goes beyond the basic level based on the supplementary literature provided. Problem solving in new and complex situations.
	5	93% -100% The scope of the presented knowledge exceeds the basic level based on self-acquired scientific sources of information

5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT

Category	Student's workload
	Full-time studies
NUMBER OF HOURS IMPLEMENTED WITH DIRECT PARTICIPATION OF THE TEACHER / CONTACT HOURS /	110
Participation in lectures *	30
Participation in classes, seminars, laboratories *	75
Participation in the exam / final test *	
Others*	5 ¹
INDEPENDENT STUDENT WORK / NON-CONTACT HOURS /	90
Preparation for the lecture *	40
Preparation for the classes, seminars, laboratories *	50
Preparation for the exam / final test *	
Gathering materials for the project/ Internet query*	
Preparation of multimedia presentation	
Others *	
TOTAL NUMBER OF HOURS	200
ECTS credits for the course of study	8

**delete as appropriate*

¹e-learning

Accepted for execution (date and signatures of the teachers running the course in the given academic year)

