Załącznik nr 5 do zarządzenia nr 189/2025

COURSE SPECIFICATION

Course code: 0912.4.LEK.C.Mi

Course title in Polish: Mikrobiologia z parazytologią
Course title in English: Microbiology with parasitology

1. Placement of the course within the study programme

1.1. Field of study	Medicine
1.2. Mode of study	Full-time
1.3. Level of study	Uniform Master's study
1.4. Profile of study	General academic
1.5. Course specification author	prof. zw. dr hab. Robert Bucki
1.6. Contact	robert.bucki@ujk.edu.pl

2. Generał characteristics of the course

2.1. Language of instruction	English
2.2. Entry requirements	anatomy, histology, physiology

3. Detailed characteristics of the course

3.1. Type of classes	lecture, classes, laboratories
3.2. Place of course delivery	Lecture /Classes/Laboratories - Courses in the teaching rooms of JKU, elearning platform
3.3. Form of assessment	lecture – E, classes / laboratories – credit with grade
3.4. Teaching methods	Practical classes, conversational lecture, discussion
3.5.a. Basic reading list	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
3.5.b. Supplementary reading list	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, content and learning outcomes

4.1. Course objectives (taking into account the form of classes)

Lectures

- **CO1.** Acquaintance with biological characteristics and classification of microorganisms.
- **CO2.** Knowing the morphology of bacteria, basics of genetics and physiology.
- **CO3.** Understanding antimicrobial defense mechanisms.
- **CO4.** Understanding of human microbiota.
- **CO5.** Acquaintance with basic microbial virulence factors.

• **CO6.** Knowing the basic characteristics and clinical significance of key bacterial groups, as well as mycobacteria, fungi and viruses causing infections in humans.

• **CO7.** Knowing the rational antibiotic therapy principles as well as strategy to seek novel therapeutics aimed at infection therapy.

• **CO8.** The basics of diagnostics and therapy of viral infections.

• **CO9.** Understanding of biology of selected human parasites.

• **CO10.** Knowing the anatomical and morphological structure of selected human parasites.

• **CO11.** Understanding the role that parasites play in humans and animals.

• **CO12.** The basics of diagnostics and therapy of parasitoses.

• **CO13.** Learning the methods to collect and store materials for diagnostics of parasitoses.

Classes

• **CO1.** Learning the basic methods used in microbiological diagnostics.

• **CO2.** Theoretical considerations concerning collection, storage and transport of microbiological material.

• **CO3.** Selection of microbiological/serological/molecular tests according to the type of infection and potential etiological factors.

• **CO4.** Learning the main groups of antibiotics (also: the most modern ones) and the mechanisms of action against bacterial / fungal cell.

• **CO5.** Learning the most clinically relevant mechanisms of bacterial drug resistance.

• **CO6.** 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.

• **CO7.** Learining the most common parasitoses in Poland / worldwide.

• **CO8.** Learning about uncommon / imported parasitoses in Poland.

• **CO9.** Learning about parasitic arthropods and arthropods acting as parasitics vectors.

• **CO10.** Learning of basic principles of parasitic diagnostics.

Laboratories

• **CO1.** Practical means of work with potentially infectious materials.

• **CO2.** Practical aspects of proper hand disinfection.

• **CO3.** Practical aspects of proper sampling, storage and transportation of material for microbiological examination.

• **CO4.** Identification of basic bacterial / fungal etiological factors (colony morphology on solid media, practical use of rapid preliminary diagnostic tests).

• **CO5.** Acquaintance with light microscopy, Gram-staining method as well as recognition of morphology of bacterial/ fungal cells in microscopy preparations.

• **CO6.** Practical aspects of diagnostics via bacterial culture, including the rules to culture of anaerobic bacteria.

• **CO7.** Practical aspects of mycological diagnostics (culture, serology).

• **CO8.** Learning the interpretation of simple microbiological test results as well as interpretation of clinically relevant drug resistance mechanisms.

• **CO9.** Recognition and analysis of selected parasites as well as structures characteristic of these parasites in microscopy preparations.

• **CO10.** Learning of basic techniques of parasitic diagnostics.

4.2. Course content (taking into count the form of classes)

Lectures Semester I - Winter

1. Basics of microbiology. Introduction to clinical microbiology
2. Basic antimicrobial defence mechanisms. Ethiopathogenesis 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

(including classes conducted with the use of distance learning methods and techniques)

1. Basics of microbiology. Introduction to clinical microbiology (2h)
2. Basic antimicrobial defence mechanisms. Ethiopathogenesis of infectious diseases. Human microbiota (2h)
3. Basics of mycology. Etiological factors of mycoses (1h)

Lectures 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)

(including classes conducted with the use of distance learning methods and techniques)

1.
2. …

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-glucosefermenting 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)

Classes Semester II – Summer

1. Antibiotics, pt. I
2. Antibiotics, pt. II
3. Clinically important drug resistance mechanisms, detection methods and clinical relevalence
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

Laboratories 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

4.3. Course learning outcomes

Course learning outcomes (code)	Upon completion of the course, the student	Alignment with programme learning outcomes
in the area of knowledge knows and understands:		
W01	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 epidemiology of infections with viruses, bacteria, fungi, prions and parasites including geographical range of their occurrence;	C.W11.
W03	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 implications of the human body exposure to chemical and physical factors and prevention principles;	C.W13.
W05	Etiology, pathogenesis, pathophysiology, transmission routes, forms and prevention of iatrogenic infections;	C.W14.
W06	Methods used in microbiological and parasitological diagnostics (indications, principles of conducting, interpretation of the result);	C.W15.
W07	Principles of disinfection, sterilization and aseptic procedures;	C.W17.

W08	The problem of drug resistance, including multi-drug resistance and principles of rational antibiotic therapy;	C.W32.
W09	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.

in the area of skills knows how to:

U01	Operate the optical microscope, also making use of immersion;	A.U1.
U02	Recognize pathogens under a microscope;	C.U5.
U03	Interpret the results of microbiological tests;	C.U6.

in the area of social competences is able to:

K01	Recognize his/her own limitations and self-evaluate educational deficiencies and needs;	K.S5.
K02	Use reliable information sources;	K.S7.
K03	Conclude on the basis of own surveys and observations;	K.S8.
K04	Introduce rules of social conduct and teamwork to the group of specialists, including specialists form other medical professions also in the multicultural and multinational environment	K.S9.
K05	Give opinions concerning various aspects of professional activity;	K.S10.
K06	Take responsibility for own decisions made during professional activities including own safety and safety of other people.	K.S11.

4.4. Assessment methods for learning outcomes

Assessment method (+/-)

Course learning outcomes (code)	Oral/written/ practical examinaion /other (specify)*	Test*	Project*	In-class activity*	Independent study*	Group work*	Other (specify)*

Type of classes

1: / 2:	L	C	Lab	L	C	Lab	L	C	Lab	L	C	Lab	L	C	Lab	L	C	Lab	L	C	Lab
W01-W09	+				+																
U01-U03											+			+			+				
K01-K06																				+	

Annotation. 1: form of classes; 2: learning outcomes

4.5. Assessment criteria for learning outcomes

Type of classes:

LECTURE (L) (including classes conducted with the use of distance learning methods and techniques)

Grade	Assessment criteria
3,0	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.
4,0	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.
5,0	93% -100% The scope of the presented knowledge exceeds the basic level based on self-acquired scientific sources of information

Type of classes:

CLASSES (C) (including classes conducted with the use of distance learning methods and techniques)

Grade	Assessment criteria
3,0	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.
4,0	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.
5,0	93% -100% The scope of the presented knowledge exceeds the basic level based on self-acquired scientific sources of information

Type of classes:

LABORATORIES Lab (including classes conducted with the use of distance learning methods and techniques)

Grade	Assessment criteria
3,0	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.
4,0	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.
5,0	93% -100% The scope of the presented knowledge exceeds the basic level based on self-acquired scientific sources of information

5. ECTS credit allocation – student workload

Category	Student workload (full-time mode)	Student workload (part-time mode)
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER (CONTACT HOURS)	**110**	
Participation in lectures*	35	
Participation in seminars/laboratories*	75	

Other (specify) e.g. classes conducted with the use of distance learning methods and techniques*		
INDEPENDENT STUDY (NON-CONTACT HOURS)	**100**	
Preparation for lectures*	40	
Preparation for seminars/laboratories*	60	
Preparation for examination/test*		
Gathering materials for project, online research*		
Preparation of a multimedia presentation*		
Other (specify)*		
TOTAL HOURS	**210**	
ECTS CREDITS for the course	**9**	

*** delete as appropriate**

Approved for implementation (date and legible signatures of course instructors in the given academic year):

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