

DESCRIPTION OF THE COURSE OF STUDY

Course code	0912-7LEK-C3.2-M	
Name of the course in	Polish	Mikrobiologia
	English	Microbiology

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. Specialization*	Lack
1.6. Unit running the course of study	Faculty of Medicine and Health Sciences
1.7. Person/s preparing the course description	prof. dr. hab. n. med. Robert Bucki
1.8. Person responsible for the course of study	prof. dr. hab. n. med. Robert Bucki
1.9. Contact	buckirobert@gmail.com

2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

2.1. Affiliation with the module	Scientific basis of medicine
2.2. Language of instruction	English
2.3. Semesters in which the course of study is offered	3 rd and 4 th semester
2.4. Prerequisites*	Anatomy, Histology, Physiology

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	LECTURE: 20 ; CLASSES – 40; LABORATORIES: 40	
3.2. Place of classes	Lecture /Classes/Laboratories - Courses in the teaching rooms of JKU	
3.3. Form of assessment	LECTURE – E, CLASSES – Zo (credit with grade)	
3.4. Teaching methods	Practical classes, conversational lecture, discussion,	
3.5. Bibliography	Required reading	1. Medical Microbiology Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller Elsevier, 2015 2. .Medical Microbiology F. H. Kayser, K. A. Bienz, J. Eckert, R. M. Zinkernagel Thieme, 2004 3. Praktyczny atlas mikrobiologii dla studentów kierunków medycznych Practical atlas of microbiology for students of medical divisions Maria Dąbrowska-Szponar, Katarzyna Garbacz, Lidia Piechowicz 2012
	Further reading	1. Hospital Acquired Infections

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED TEACHING OUTCOMES

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

Lecture

- Acquaintance with biological characteristics and classification of microorganisms.
- Knowing the morphology of bacteria, basics of genetics and physiology
- Understanding antimicrobial defense mechanisms
- Acquaintance with the basic definitions of infection
- Identification of the main pathogens of microorganisms
- Presentation of general characteristics as well as clinical significance of pivotal pathogenic bacteria
- Basics of diagnosis and therapy of viral infections

Classes

- Theoretical knowledge of the collecting principles, storing and transmitting material for research
- Acquaintance with the main groups of antimicrobials drugs and their modes of action on bacterial / fungal cells
- Getting to know the principles of rational targeted and empirical antibiotic therapy
- Familiarity with the clinically important mechanisms of microbial resistance to antibiotics
- Knowledge of the principles of disinfection and sterilization based on knowledge of the basics of epidemiology of infectious diseases - especially in the situation of hospital infections

Laboratories

- Diagnosis of etiological factors and mechanisms of pathogenesis of infections caused by microorganisms
- Selection of microbiological / serological tests depending on the type of infection and potential etiological factors
- Practical knowledge of the collecting principles, storing and transmitting material for microbiological examination
- Acquire the ability to interpret the results of microbiological and serological tests
- Practical presentation of clinically important antibiotic resistance mechanisms for antibiotics
- Acquisition of practical skills of proper hands disinfection
- Acquire skills to distinguish between hospital and non-hospital infections

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

- Classification and general characteristic of microorganisms.
- Forms and mechanisms of interaction in a microbe-host.
- The normal flora of humans.
- Etiopathogenesis and epidemiology of infections (source of infection, transmission routes, susceptible population, risk factors)
- Microbiological diagnostics
- The basic group of antimicrobial drugs - mechanism of action, spectrum
- Clinically important mechanisms of antimicrobial resistance to antibiotics
- Empiric and targeted therapy.
- Disinfection, sterilization and aseptic procedure.
- Prevention of infections.
- Hospital infections.

LECTURES:

Lecture 1 Fundamentals of microbiology. Introduction to medical microbiology

Lecture 2 Basic anti-microbial defense mechanisms. Etiopathogenesis of infectious diseases. Human microbe

Lecture 3 General characteristics and clinical relevance of selected groups of pathogenic bacteria- part I

Lecture 4 General characteristics and clinical relevance of selected groups of pathogenic bacteria- part II

Lecture 5 Fundamentals of mycology. Etiological factors of fungal infections. Antifungal drugs.

Lecture 6 Introduction to antibiotic therapy. Strategies for the search for new antibacterial drugs

Lecture 7 Characteristics, clinical significance of mycobacteria.

Lecture 8 Basics of virology. Viral agents for etiologic infections in humans

Lecture 9 Viral agents for etiologic infections in humans- part II. Viral infections - the basis of diagnosis and therapy.

Lecture 10 Infections associated with biofilm formation.

CLASSES:

Classes 1 Health and Safety principles at the Microbiological Laboratory. Structure of the bacterial cell. Morphology of bacteria. Microscopic methods used in microbiology.

Classes 2 Microbiological Research Techniques – culture on solid and liquid substrates.

Classes 3 Microbiological diagnostics in practice - classes in the hospital microbiological laboratory.

Classes 4 Microbial growth control: aseptic, antiseptic, disinfection, sterilization.

Classes 5 Characterization of selected Gram-positive bacteria (*Staphylococcus*, *Streptococcus*, *Enterococcus*, *Listeria*, *Corynebacterium*, *Bacillus*).

Classes 6 Characteristics of selected gram-negative rods *Enterobacteriaceae*, *Vibrio*, *Aeromonas*, *Plesiomonas*, non fermenting gram negative rods: *Pseudomonas*, *Acinetobacter*, *Burkholderia*, *Stenotrophomonas maltophilia*

Classes 7 Gram-negative cocci (*Neisseria*, *Moraxella*). Small gram negative rods *Haemophilus*, *Bordetella*. Others: *Legionella pneumophila*. *Mycoplasma pneumoniae*, *Chlamydia*.

Classes 8 Characteristic of selected anaerobic bacteria and actinomycetes *Actinomyces*, *Nocardia*.

Classes 9 Yeasts and molds (fungi). Diagnosis of mycosis.

Classes 10 TEST 1 (including classes 7-9 and laboratories 8- 9).

Classes 11 Antibiotics. Marking methods of microbial susceptibility.

Classes 12 Clinically important mechanisms of microbial resistance to antibiotics, their Detection and clinical significance.

Classes 13 Upper and lower respiratory tract infections.

Classes 14 Selected infections of the skin and soft tissues, including surgical site infection.

Classes 15 Urinary tract infections

Classes 16 Gynecological infections– multi-bacterial vaginosis, trichomoniasis, thrush. Sexually transmitted diseases.

Classes 17 Gastric and intestinal infections. Food poisoning.

Classes 18 Infection of the blood bearing. Endocarditis.

Classes 19 Infections of the central nervous system

Classes 20 Test including 15-19 and laboratories 16-19.

LABORATORIES:

Laboratory 1 Handwashing Hygiene / hand disinfection. Formation and staining preparation. Principles of microscopy

Laboratory 2 Exemplary solid and liquid substrates used in bacteriological diagnostics - assessment of the type of growth and morphology of the colony– assessment of growth and colony morphology. Materials inoculations, Culture establishment.

Laboratory 3 Commercial tests used to identify microorganisms: diagnostic discs, tests. Demonstration of apparatus used in the microbiological laboratory.

Laboratory 4 Microbiological control of hospital space. Microbiological control of air. Control of hands disinfection. Control of sterilization processes.

Laboratory 5 Characterization of growth and morphology of selected Gram-positive bacteria. Selected identification tests

Laboratory 6 Growth and morphology characteristics of selected Gram-negative sticks. Evaluation of growth on the substrates, evaluation of microscope preparations, performance of selected identification tests.

Laboratory 7 Test– classes and laboratories 1-6

Laboratory 8 Presentation of culture of selected anaerobic bacteria, evaluation of microscopic preparations, demonstration of commercial biochemical tests. Analysis of microbiological results.

Laboratory 9 Yeast and mold fungus. Classical diagnostics of mycosis. Presentation of culture, evaluation of microscopic preparations, demonstration of commercial biochemical tests.

Laboratory 10 Serological and molecular diagnostics of mycosis. Antifungal drugs. Analysis of mycological

results.

Laboratory 11 performance of the antibiogram using diffusion-pulse method for selected microorganisms.

Laboratory 12 Reading and interpretation of antibiograms for selected microorganisms. Reading and interpretation of E-tests. Antibiograms with resistance mechanisms: ESBL, MRSA, VRE, other (presentation, discussion, interpretation)

Laboratory 13 Upper and lower respiratory tract infections – collection of test materials, analysis of sample referrals, diagnostics, analysis of sample results of microbiological tests.

Laboratory 14 Selected skin and soft tissue infections – collection of test materials, diagnostics, analysis of sample results of microbiological tests.

Laboratory 15 Test- classes 11-14 and laboratories 10-14

Laboratory 16 Diagnosis of urinary tract infections and selected sexually transmitted infections. Carriage of Streptococcus agalactiae in pregnant women – detection, prevention. Analysis of sample results.

Laboratory 17 Diagnosis of infectious diarrhea. Diagnosis, treatment, prevention of infection with Clostridium difficile etiology

Laboratory 18 Diagnosis of blood bearing infections. Principles of blood collection for microbiological examination. Analysis of microbiological results . Evaluation of microscopic preparations.

Laboratory 19 Infections of the central nervous system – diagnostics, evaluation of microbiological preparations and exemplary results of microbiological tests.

Laboratory 20 Interpretation of Microbiological Test Results. Selected methods for the control of hospital infections.

4.3.Education outcomes in the discipline

Code	A student, who passed the course	Relation to teaching outcomes
within the scope of KNOWLEDGE:		
W01	classifies microorganisms, including pathogenic ones and those present in the normal flora;	C.W12.
W02	knows the epidemiology of infections with viruses, bacteria as well as fungal and parasites infections, including geographical range of their occurrence;	C.W13.
W03	understands the impact of abiotic and biotic (viruses, bacteria) environmental factors on the human body and population of people and their ways of penetration into the human body; describes the implications of the human body exposure to various chemical and biological factors and prevention principles;	C.W14.
W04	knows the symptoms of iatrogenic infections, routes of biological dispersal and pathogens causing changes in individual organs;	C.W17.
W05	knows and understands the basics of microbiological and parasitological diagnosis;	C.W18.
W06	knows the basics of disinfection, sterilization and aseptic procedures;	C.W19.
within the scope of ABILITIES:		

U01	operates the optical microscope, also making use of immersion;	A.U1.
U02	assesses environmental hazards and uses basic methods allowing to detect the presence of harmful agents (biological and chemical) in the biosphere;	C.U6.
U03	recognizes the most common human parasites on the basis of their construction, life cycles and symptoms of the disease	C.U7.
U04	prepares a microscopic formulation and recognizes pathogens under a microscope;	C.U9.
U05	interprets the results of microbiological tests;	C.U10.

4.4. Methods of assessment of the intended teaching outcomes

Teaching outcomes (code)	Method of assessment (+/-)																					
	Exam oral/written*			Test*			Effort in class*			Effort in class*			Self-study*			Group work*			Others*			
	Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			
	L	C	...	L	C	...	L	C	P	L	C	...	L	C	...	L	C	...	L	C	...	L
W01	+																					
W02	+																					
W03	+																					
W04	+																					
W05	+																					
W06	+																					
U01										+												
U02										+												
U03										+												
U04										+												
U05										+												

*delete as appropriate

4.5. Criteria of assessment of the intended teaching outcomes

Form of classes	Grade	Criterion of assessment
Practical classes	3	51% - 60%
	3,5	61% - 70%
	4	71% - 80%
	4,5	71% - 80%
	5	91% - 100%
classes (C)	3	51% - 60%
	3,5	61% - 70%
	4	71% - 80%
	4,5	71% - 80%
	5	91% - 100%
Lecture (L)	3	Learning programme content on the basic level, replies chaotic, leading questions necessary
	3,5	Learning programme content on the basic level, answers systematized, requires assistance from the teacher
	4	Learning programme content on the basic level, answers systematized, independent. Solving of problems in typical situations.
	4,5	The scope of presented knowledge exceeds the basic level based on the supplementary literature provided. Solving of problems in new complex situations
	5	The scope of presented knowledge exceeds the basic level based on independently acquired scientific sources of information.

Conditions for obtaining credit:

1. Condition for admission to the examination is the completion of all classes (including written tests) as well as presence in all lectures.
2. Practical and theoretical knowledge required, not only the current subject, but also aspects previously discussed and related to the course subject.
3. All students will be assessed during each class.
- 4 The grade, including insufficient can be improved only once within 14 days, during subsequent classes. Test correction will be performed within two weeks.
5. Study Regulations do not allow an unexcused absence. An unexcused absence can be fulfilled during next class.
6. The assistant conducting classes with the group of students is responsible for the above mentioned organizational matters.
7. A final written exam.

Criteria for evaluation of oral answer

1. Provision of a comprehensive answer to the problem (task)
2. Skill of integration of knowledge from allied domains (disciplines)
3. Independence and/or creativity in the presentation of the scope of problems, proposals of solutions
4. Presentation of the current knowledge related with the discipline (domain)
5. Recognition of problems resulting from the task

Criteria for evaluation of written answer

1. Compliance with the essence of the subject matter of work (task) /
2. Provision of a comprehensive answer to the problem (task) /
3. Skill of integration of knowledge from allied domains (disciplines) /
4. Independence and/or creativity in the presentation of the scope of problems
5. Presentation of the current knowledge related with the discipline (domain), pertinent selection of literature.

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

Category	Student's workload
	Full-time studies
<i>NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/</i>	100
<i>Participation in lectures*</i>	20
<i>Participation in classes, seminars, laboratories*</i>	80
<i>Preparation in the exam/ final test*</i>	
<i>Others*</i>	
<i>INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/</i>	100
<i>Preparation for the lecture*</i>	20
<i>Preparation for the classes, seminars, laboratories*</i>	80
<i>Preparation for the exam/test*</i>	
<i>Gathering materials for the project/Internet query*</i>	
<i>Preparation of multimedia presentation</i>	
<i>Others*</i>	
<i>TOTAL NUMBER OF HOURS</i>	200
ECTS credits for the course of study	8

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

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