

Course description

Part 1

General information about the course		
1. Major of study: medicine		2. Study level: unified MSc
		3. Form of study: intramural
4. Year: IV		5. Semestr / Semester: 7
6. Course name: Microbiology & Virology		
7. Course status: required		
8. Course contents and assigned learning outcomes Preclinical Sciences: Microbiology & Virology Laboratory diagnosis of infectious diseases – technique of obtaining the specimens, transport to the laboratory. Methods of cultivation and identification of bacteria. Sterilisation and disinfection: definitions, controls. Systemic bacteriology: Gram-positive cocci. Systemic bacteriology: Gram-negative cocci. Characteristic of capnophilic bacteria. Cerebrospinal fluid examination. Systemic bacteriology: Gram-positive rods. <i>Mycobacteria</i> . Characteristics and classification Gram-negative rods <i>Enterobacteriales</i> family and non-fermented. Laboratory diagnosis. Mechanisms of antibiotic resistance (AmpC, ESBL, MBL, KPC, NDM, OXA-48). <i>Enterobacteriales</i> I: general features. <i>Escherichia coli</i> – characteristic, antigenic structure, methods of identification. <i>Klebsiella</i> spp., <i>Proteus</i> spp., <i>Yersinia</i> spp. and others. Urinary tract infections (UTI): pathogenesis, and general diagnostic approaches. Systemic bacteriology: anaerobic bacteria. Medically important Clostridia – prevention and treatment of diseases caused by: <i>Clostridium tetani</i> , <i>Clostridium botulinum</i> , <i>Clostridium perfringens</i> and <i>Clostridioides difficile</i> . Sexually transmitted diseases. Enteric infections and food poisoning. Laboratory diagnosis and etiological agents of respiratory tract infections. Fastidious bacteria. Parasitology: Definition of parasitology. The definition of parasitism. Classification of parasites. Selected parasite infections of the gastrointestinal tract, genitourinary tract, blood and tissues. Hospital infections: laboratory methods required for confirmation of hospital infection. Yeasts and Molds important in medicine. Viral diseases, diagnostic approaches. Zoonoses and microbiological diagnosis.		
Learning outcomes / reference to learning outcomes indicated in the standards For knowledge – student knows and understands: C.W11-C.W20, C.W40 For skills student can do: C.U6 - C.U12, C.U15 For social competencies student is ready to: II 3C, II 3		
9. Number of hours for the course		70
10. Number of ECTS points for the course		6
11. Methods of verification and evaluation of learning outcomes		
Learning outcomes	Methods of verification	Methods of evaluation*
Knowledge Student knows and understands: 1. knows bacterial mechanisms of acquired antibiotic resistance [C.W11] 2. classifies		* Very good (5,0) – the assumed learning outcomes have been achieved and significantly exceed the required level Better than good (4,5) – the assumed learning outcomes have been achieved and

microorganisms, as pathogenic and belonging to physiological microflora [C.W.12] 3. knows the epidemiology of viral, bacterial, fungal and parasitic infections, taking into account the geographical range of their occurrence [C.W.13] 4. knows the impact of abiotic and biotic (viruses, bacteria) environmental factors on the human body and the human population, and the ways of entering the human body; [C.W14] 5. knows the consequences of exposure of the human body to various biological factors and the principles of prevention [C.W15] 6. knows invasive forms or developmental stages of selected parasitic fungi, protozoa, helminthes, taking into account the geographical range of their occurrence; [C.W16] 7. knows the principle of the parasite-host interactions and knows the basic disease symptoms caused by parasites [C.W17] 8. knows symptoms of iatrogenic diseases, their transmission pathways and pathogens causing changes in individual organs [C.W18] 9. knows the basics of microbiologic and parasitologic diagnostics [C.W19] 10. knows basics of disinfection, sterilization and aseptic procedures [C.W20] 11. knows the problem of drug (antibiotic) resistance, including multi-drug	Grade credit – MCQ (3 middle exams during semester)	slightly exceed the required level Good (4,0) – the assumed learning outcomes have been achieved at the required level Better than satisfactory (3,5) – the assumed learning outcomes have been achieved at the average required level Satisfactory (3,0) – the assumed learning outcomes have been achieved at the minimum required level Unsatisfactory (2,0) – the assumed learning outcomes have not been achieved
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resistance of bacteria [C.W40]		
Skills 1. is able to assess environmental hazards and uses the basic methods to detect the presence of biological harmful factors in the biosphere [C.U6] 2. is able to recognize the most common human parasites, based on their structure, life cycles and symptoms of diseases [C.U7] 3. can use the antigen-antibody reaction in current modifications and techniques for the diagnosis of infectious diseases [C.U8] 2. is able to prepare microscopic slides and recognizes pathogens under the microscop [C.U9] 3. is able to do interpretation the results of microbiological tests [C.U10] 4. is able to associate images of tissue and organ damage with clinical manifestations of the disease, medical history and laboratory results [C.U11] 5. can analyze reactive, defensive and adaptive phenomena as well as regulation disorders caused by an etiological factor [C.U12] 6. can design patterns of rational empirical and targeted chemotherapy for infection [C.U15]	Observation and *Practical Exam (on the end of lab. classes)	Passing/or not
Competencies 1. student understands and recognizes the need to	Observation	* Observation

respect medical confidentiality, patient rights and is aware of its own limitations and the need for continuous training		
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* The following evaluation system has been assumed:

Very good (5,0) – the assumed learning outcomes have been achieved and significantly exceed the required level

Better than good (4,5) – the assumed learning outcomes have been achieved and slightly exceed the required level

Good (4,0) – the assumed learning outcomes have been achieved at the required level

Better than satisfactory (3,5) – the assumed learning outcomes have been achieved at the average required level

Satisfactory (3,0) – the assumed learning outcomes have been achieved at the minimum required level

Unsatisfactory (2,0) – the assumed learning outcomes have not been achieved

Course description

Part 2

Other useful information about the course		
12. Name of Department, mailing address, e-mail: Department of Medical Microbiology, 18 Medyków str., 40-752 Katowice. gmartir@sum.edu.pl mhudziak@sum.edu.pl pkLucinski@sum.edu.pl romanikmargo@poczta.onet.pl		
13. Name of the course coordinator: Prof. dr hab.med. Gayane Martirosian		
14. Prerequisites for knowledge, skills and other competencies: Basics of biology, anatomy, histology and physiology of human body. Competencies in manual laboratory work.		
15. Number of students in groups	In accordance with the Senate Resolution	
16. Study materials	Slides, bacterial cultures, antibiotic susceptibility testing for different bacterial strains, vaccines, agents for disinfection and sterilization, atlases, schemes, recommendations for diagnostics of infections and their treatment.	
17. Location of classes	Laboratory rooms (118, 119 – C2), and room 509 in the Department (C3)	
18. Location and time for contact hours	Department of Medical Microbiology, building C3, 5 th floor, each wednesday between 1:00 and 2:00 p.m.	
19. Learning outcomes		
Number of the course learning outcome	Course learning outcomes	Reference to learning outcomes indicated in the standards
P_W01 / C_K01	the graduate knows and understands: types and species as well as the structure of viruses, bacteria, fungi and parasites, their biological features and pathogenic mechanisms; human physiological bacterial flora; basics of epidemiology and prophylaxis of viral and bacterial infections, fungal and parasitic infections and ways of their spread in the human body;	C.W13 C.W15
P_W02 / C_K02	human physiological bacterial flora; basics of epidemiology of viral and bacterial infections, fungal and parasitic infections and ways of their	C.W12 C.W16 C.W19

	spread in the human body; Basics of microbiological and parasitic diagnostics	
P_W03/C_KO3	species of bacteria, viruses and fungi, which are the most common etiological factors of infection, infection and infection; basics of disinfection, sterilization and aseptic treatment; external and internal pathogens;	C.W14 C.W17 C.W20
P_W04/C_KO4	the phenomenon of antibiotic resistance, their genetics, symptoms of iatrogenic infections, their transmission and changes in different organs	C.W11 C.W18
P_U01 / C_S01	the graduate is able to: -assess environmental hazards and uses the basic methods to detect the presence of biological harmful factors in the biosphere; -recognize the most common human parasites, based on their structure, life cycles and symptoms of diseases; - use the antigen-antibody reaction in current modifications and techniques for the diagnosis of infectious diseases	C.U6 C.U7 C.U8
P_U02 / C_S02	- prepare microscopic slides and recognizes pathogens under the microscope - do interpretation the results of microbiological tests; - associate images of tissue and organ damage with clinical manifestations of the disease, medical history and laboratory results	C.U9 C.U10 C.U11
P_U03/C_S03	- analyze reactive, defensive and adaptive phenomena as well as regulation disorders caused by an etiological factor	C.U12
P_U04/C_S04	- design patterns of rational empirical and targeted chemotherapy for infection	C.U15
20. Forms and topics of classes		Number of hours
21.1. Lectures		15
Introduction in Medical Microbiology		2
Bacterial requirements for correct metabolism, bacterial genetics.		2
Pathogenesis of medically important bacteria. Normal microbial flora of the human body. Role of the resident microflora - beneficial effect of the normal flora. Host parasite relationship: antigenic structure of bacteria and immune response. Antibiotics and mechanisms of their actions on bacterial cells. Mechanisms of antibiotic-resistance.		4
Viruses as causative agents of infectious diseases. Diagnostic approaches. Hepatitis viruses, HIV & AIDS, infections in immunocompromised patients.		3
Healthcare-associated infections and hospital infection-control. Zoonoses epidemiology and prophylaxis. Yeasts and molds as an etiological agents of infections, diagnostic rules.		4
22.2. Seminars [15] Laboratory diagnosis of infectious diseases – technique of obtaining the specimens, transport to the laboratory. Methods of cultivation and identification of bacteria.		2
Sterilisation and disinfection: definitions, controls. Systemic bacteriology: Gram-positive cocci		2

Systemic bacteriology: Gram-negative cocci. Systemic bacteriology: Gram-positive rods. <i>Mycobacteria</i>. Characteristics and classification Gram-negative rods <i>Enterobacteriales</i> family and non-fermented. Laboratory diagnosis. Mechanisms of antibiotic resistance (AmpC, ESBL, MBL, KPC, NDM, OXA-48). Systemic bacteriology: anaerobic bacteria. Medically important <i>Clostridia</i> – prevention and treatment of diseases caused by: <i>Clostridium tetani</i>, <i>Clostridium botulinum</i>, <i>Clostridium perfringens</i> and <i>Clostridioides difficile</i>.	4
Sexually transmitted diseases. Enteric infections and food poisoning. Laboratory diagnosis and etiological agents of respiratory tract infections. Fastidious bacteria.	4
Parasitology. Definition of parasitology. The definition of parasitism. Classification of parasites. Selected parasite infections of the gastrointestinal tract, genitourinary tract, blood and tissues. Hospital infections: laboratory methods required for confirmation of hospital infection. Course review.	3
23.3. Labs	40
Structure of bacterial cells. Microscopic observation of bacteria (light microscope and dark-field techniques). Bacterial staining techniques. The simple staining technique (crystal violet or methylene blue) and Gram-staining technique. Physiology of bacteria. Nutritional requirements and nutritional types. Cellular metabolism, culture media. Specimen processing in laboratory. Assay of surrounding microflora. Antibiotic susceptibility testing of different bacterial species.	9
Gram-negative cocci (<i>Neisseria</i>, <i>Moraxella</i>) and <i>Haemophilus</i> spp. methods for isolation, identification and antibiotic susceptibility testing. I Test exam. <i>Mycobacteria</i> – laboratory diagnosis of tuberculosis. <i>Nocardia</i>. Spore-forming aerobic Gram-positive bacilli: <i>Bacillus</i>. Non spore forming Gram-positive rods (<i>Corynebacterium</i> spp., <i>Listeria</i> sp., <i>Erysipelothrix</i> sp.). <i>Enterobacteriales</i> I: general features. <i>Escherichia coli</i> – characteristic, antigenic structure, methods of identification. <i>Klebsiella</i> spp., <i>Proteus</i> spp., <i>Yersinia</i> spp. and others. Urinary tract infections (UTI): pathogenesis, and general diagnostic approaches. Spore-forming Gram-positive anaerobic rods (<i>Clostridium</i> spp.). Non spore-forming anaerobes. Actinomycetes – laboratory diagnosis of infection caused by <i>Actinomyces</i>.	12
Spirochetes. <i>Treponema pallidum</i>, <i>Leptospira</i> and <i>Borrelia</i>. Morphology and antigenic structure. Clinical manifestations and laboratory diagnosis of syphilis and gonorrhea. II Test exam. <i>Enterobacteriales</i>: Inflammatory diarrhea (determination of pathogens in fecal specimens). <i>Salmonella</i> spp. and <i>Shigella</i> spp. – characteristics, clinical manifestations, and laboratory diagnosis of diseases. Treatment and prevention. <i>Vibrio</i>, <i>Campylobacter</i> and <i>Helicobacter</i> – characteristics, clinical manifestations and diagnosis of infection. <i>Bordetella</i>: morphology, growth requirements and diseases (diagnosis, treatment and prevention). <i>Legionella</i> – bacteriologic features, and diseases (legionnaires disease and Pontiac fever).	12

<i>Chlamydia</i> – laboratory diagnosis, treatment and prevention. Clinical manifestations, laboratory diagnosis and treatment: <i>Mycoplasma</i>, <i>Rickettsia</i>, <i>Ehrlichia</i> and <i>Coxiella</i>. Basic mycology – laboratory diagnosis of systemic mycoses. III Test exam. Laboratory diagnosis of diseases caused by fastidious bacteria.	
Life cycles, pathogenicity and diagnosis of parasite infections: <i>Plasmodium</i> spp. and <i>Balantidium coli</i>. The differentiation of intestinal amebiasis (<i>amoebosis</i>) and bacterial dysentery (<i>shigellosis</i>). The serological diagnosis of toxoplasmosis. Diagnostic methods for parasitology. Determinations of bacterial resistance mechanisms. <i>Pseudomonas aeruginosa</i>, <i>Acinetobacter</i> spp. and other opportunistic Gram-negative "nonfermenters". Course review. Practical exam.	7
24. Readings	
Murray: Medical Microbiology, 8th Edition; Medical Microbiology. Jawetz, Melnick & Adelberg's. 24th Edition; Case Files Microbiology (50 clinical cases with USMLE-style questions, 2005); Review of Medical Microbiology and Immunology. Warren Levinson. Tenth Edition; Clinical Microbiology made ridiculously simple. Mark Gladwin, Bill Trattler, last Edition.	
25. Detail evaluation criteria	
In accordance with the recommendations of the inspection bodies Completion of the course – student has achieved the assumed learning outcomes Detail criteria for completion and evaluation of the course are specified in the course regulations	