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|  | | | **UNIVERSITY OF EAST SARAJEVO**  Faculty of Medicine | | | | | | | | | | |  | | |
| ***Study program:medicine*** | | | | | | | | | | |
| Integrated academic studies | | | | | | II study year | | | | |
| **Full subject title** | | | MICROBIOLOGY | | | | | | | | | | | | | |
| **Department** | | | Department of Propedeutics, Faculty of Medicine in Foca | | | | | | | | | | | | | |
| **Subject code** | | | | | | **Subject status** | | | | | **Semester** | | | **ECTS** | | |
|
| ME-01-1-016-3; ME-01-1-016-4 | | | | | | compulsory | | | | | III,IV | | | 10 | | |
| **Professor/ -s** | | Full professor Nebojsa Arsenijevic,,MD PhD; full professor Ivan Jovanovic, MD, PhD; assistant professor Nevena Gajovic, MD PhD | | | | | | | | | | | | | | |
| **Associate/ -s** | | Vladimir Markovic MD, Zorana Maric Ostovic MD | | | | | | | | | | | | | | |
| **Number of lectures/ teaching workload (per week)** | | | | | | | **Individual student workload (in hours per semester)** | | | | | | | | **Coefficient of student workload So[[1]](#footnote-0)** | |
| **L** | **E** | | | | **SP** | | **L** | | | **E** | | **SP** | | | **So** | |
| 2 | 3 | | | | 0 | | 2\*15\*1 | | | 3\*15\*1 | | 0\*15\*1 | | | 1 | |
| 2 | 3 | | | | 0 | | 2\*15\*1 | | | 3\*15\*1 | | 0\*15\*1 | | | 1 | |
| total teaching workload (in hours, per semester)  2\*15 + 3\*15 + 0\*15 = 75  2\*15 + 3\*15 + 0\*15 = 75 | | | | | | | | total student workload (in hours, per semester)  2\*15\*1+ 3\*15\*1 + 0\*15\*1 = 75  2\*15\*1+ 3\*15\*1 + 0\*15\*1 = 75 | | | | | | | | |
| Total subject workload (teaching + student):150+150=300 hours | | | | | | | | | | | | | | | | |
| **Learning outcomes** | | Knowledge gained during the course of teaching allows the doctor of medicine to:  1. recognize possible causes of infectious diseases within clinical manifestations  2. determine the type of patient material for diagnosing the disease  3. properly interpret the microbiological findings  4. apply measures of control and prevention of infectious diseases | | | | | | | | | | | | | | |
| **Preconditions** | | Precondition for taking the exam: all year I exams passed | | | | | | | | | | | | | | |
| **Teaching methods** | | lectures, seminars, exercises, colloquium | | | | | | | | | | | | | | |
| **Subject content per week** | | **Lectures:**  1. BACTERIAL CELL BIOLOGY 1. Forms of bacteria, structure of bacterial cells. Establishment of infection. Pathogenicity. Virulence. Mechanisms of tissue damage. Distribution of microorganisms. Normal microflora.  2. BACTERIAL CELL BIOLOGY 2. The structure of the cell wall of G + and G- bacteria. Capsule, flagel, pili. Bacterial DNA. Mechanisms for exchange of gene material of bacteria . Endospore. Conditions for the growth and reproduction of bacteria. The metabolism of bacteria.  3. BACTERIAL CELL BIOLOGY 3. Tissue damage by toxins of microorganisms. Antibiotics. Antibiogram. Mechanisms of resistance of bacteria to antibiotics and chemotherapeutics.  4. GRAM POSITIVE COCCI. Staphylococcus : pyogenic infections and toxin-mediated diseases  5. GRAM POSITIVE AND GRAM NEGATIVE COCCI. Streptococcus, Enterococcus. Pneumococcus, bacterial pneumonia. Gram - negative cocci, Neisseriae.  6. HEMOPHILIC AND OTHER FASTIDIOUS GRAM NEGATIVE BACILLI. Bordetella pertussisi parapertussis, whooping cough, Legionella, Haemophylus influenzae.  7. INTESTINAL BACTERIA THAT CAUSE SECRETORY DIARRHEA. Enterobacteriaceae, Vibrionaceae  8. INVASIVE GASTROINTESTINAL INFECTIONS. Shigella. Enterohemorrhagic E. Coli. Salmonella. Helicobacter pylori.  9. NON-INVASIVE GASTROINTESTINAL AND INTRA-ABDOMINAL INFECTIONS. Pseudomonas aeruginosa. Acinetobacter spp. Stenotrophomonas maltophilia. Bacteroides.  10. ANAEROBIC GRAM POSITIVE BACILLI. Clostridiae : diarrhea, tissue infections, botulism and tetanus. Clostridium difficile. Clostridium perfrigens. Clostridium botulinum. Clostridium tetans.  11. MYCOBACTERIA. Mycobacterium tuberculosis. Mycobacterium leprae.  12. Potential biological weapons: anthrax, plague, tularemia, botulism. Corynebacterium dyphteriae. Cat scratch disease, Bartonella henselae.  13. SPIRAL BACTERIA. Treponema pallidum. Borrelia burgdorferi.  14. INTRACELLULAR BACTERIA. Chlamydiae. Rickettsiae. Mycoplasmae.  15. ZOONOSES. Brucella spp. Leptospira spp.  16. INTRODUCTION TO PARASITOLOGY. Intestinal protozoa  17. PROTOZOA AND INSECTS. Blood and tissue protozoa. Sarcoptes scabiei, lice, fleas, mosquitoes, ticks. Antiprotozoal agents and antihelminthicagents  18. HELMINTHS. Intestinal helminths. Blood and tissue helminths. Antihelmintics  19. INTRODUCTION TO MYCOLOGY.  20. ENDEMIC MYCOSIS.  21. Opportunistic fungal infections. Subcutaneous, cutaneous and superficial mycosis. Antifungal agents.  22. VIRUS BIOLOGY. The structure of the virus. Replication of the viral genome.  23 Picornaviruses, Coronaviruses and Adenoviruses  24.Paramyxoviruses and Orthomyxoviruses and rash fevers.  25. HERPESVIRUSES.  26. Rabies lyssavirus and Human papillomaviruses.  27. HEPATITIS VIRUSES.  28. PATHOGENIC HUMAN RETROVIRUSES, REVERSE TRANSCRIPTASE, HISTORY OF RETROVIROLOGY, PRION DISEASE  29. HIV. AIDS.  30. ARBOVIRUSES AND VIRUSES THAT CAUSE HEMORRHAGIC FEVER.  **Exercises:**   1. Taking samples for bacteriological examination. Sending samples for bacteriological examination. 2. BACTERIAL CELL BIOLOGY 1. Establishment of infection. Pathogenicity. Virulence. Mechanisms of tissue damage. Distribution of microorganisms. Normal microflora. 3. BACTERIAL CELL BIOLOGY 2. Forms of bacteria, structure of bacterial cells. The structure of the cell wall of G + and G- bacteria. Capsule, flagel, pili. Bacterial DNA. Mechanisms for exchange of gene material of bacteria . Endospore. Microscopic visualization of morphological and functional structures of bacterial cells. 4. BACTERIAL CELL BIOLOGY 3 Conditions for the growth and reproduction of bacteria. The metabolism of bacteria. Methods for isolating bacteria (nutrients and conditions for cultivation of bacteria in vitro; seeding of nutrients). Identification of isolated culture of bacteria (examination of microscopic, cultural, physiological and biochemical properties). 5. Tissue damage by toxins of microorganisms. Antibiotics. Methods for testing the susceptibility of bacteria to antibiotics and chemotherapeutics (preparation and guidelines for interpretation of the disk diffusion and broth dilution method of the antibiogram). 6. GRAM POSITIVE AND GRAM NEGATIVE COCCI. Staphylococcus, Streptococcus, Enterococcus. Pneumococcus, bacterial pneumonia. Gram - negative cocci, Neisseriae. 7. HEMOPHILIC AND OTHER FASTIDIOUS GRAM NEGATIVE BACILLI. Bordetella pertussisi parapertussis, whooping cough, Legionella, Haemophylus influenzae. 8. INTESTINAL BACTERIA THAT CAUSE SECRETORY DIARRHEA. Enterobacteriaceae, Vibrionaceae 9. INVASIVE GASTROINTESTINAL INFECTIONS. Shigella. Enterohemorrhagic E. Coli. Salmonella. Helicobacter pylori. 10. NON-INVASIVE GASTROINTESTINAL AND INTRA-ABDOMINAL INFECTIONS. Pseudomonas aeruginosa. Acinetobacter spp. Stenotrophomonas maltophilia. Bacteroides. 11. ANAEROBIC GRAM POSITIVE BACILLI. Clostridiae : diarrhea, tissue infections, botulism and tetanus. Clostridium difficile. Clostridium perfrigens. Clostridium botulinum. Clostridium tetans. 12. MYCOBACTERIA. Mycobacterium tuberculosis. Mycobacterium leprae. 13. Potential biological weapons: anthrax, plague, tularemia, botulism. Corynebacterium dyphteriae. Cat scratch disease, Bartonella henselae. 14. SPIRAL BACTERIA. Treponema pallidum. Borrelia burgdorferi. ZOONOSES. Brucella spp. Leptospira spp. 15. INTRACELLULAR BACTERIA. Chlamydiae. Rickettsiae. Mycoplasmae. 16. INTRODUCTION TO PARASITOLOGY. Intestinal protozoa 17. PROTOZOA AND INSECTS. Blood and tissue protozoa. Sarcoptes scabiei, lice, fleas, mosquitoes, ticks. Antiprotozoal agents and antihelminthicagents 18. HELMINTHS 1. Intestinal helminths 19. HELMINTHS 2. Blood and tissue helminthes. 20. INTRODUCTION TO MYCOLOGY. ENDEMIC MYCOSIS. 21. Opportunistic fungal infections. Subcutaneous , cutaneous and superficial mycosis. 22. VIRUS BIOLOGY .Genetics, recombination, interference. Basic principles of virological diagnostics. Taking and sending materials for virological examination. 23. Viral isolation techniqes in living cell systems. Evidence of the presence of the virus in cell culture, embrionated eggs and experimental aminals. 24. Virus identification techniques: EM, proving viral antigens and the viral genome. Serology diagnostics of viral infections:. Possibilities of serology diagnostic.types of serology reactions 25. PICORNAVIRUS, CORONAVIRUS AND ADENOVIRUS 26. PARAMYXOVIRUSES AND ORTHOMYXOVIRUSES AND RASH FEVERS. 27. HERPESVIRUSES. PAPILLOMAVIRUSES. 28. HEPATITIS VIRUSES. 29. RABIES LYSSA VIRUS, ARBOVIRUSES AND VIRUSES THAT CAUSE HEMORRHAGIC FEVER. 30. HIV. AIDS. PRION DISEASE. | | | | | | | | | | | | | | |
| **Compulsory literature** | | | | | | | | | | | | | | | | |
| **Author/s** | | | | **Publication title, Publisher** | | | | | | | | | **Year** | | **Pages (from-to)** | |
| N.Cary Engleberg: | | | | Schaechter's Mechanisms of Microbial Disease.Walters Kluwer, | | | | | | | | | 2012 | |  | |
| Abul K.Abbas,Andrew H.Lichtman,Shiv Pillai | | | | Basic Immunology.Elsevier, | | | | | | | | | 2019 | |  | |
| **Additional literature** | | | | | | | | | | | | | | | | |
| **Author/s** | | | | **Publication title, Publisher** | | | | | | | | | **Year** | | **Pages (from-to)** | |
| **Student responsibilities, types of student assessment and grading** | | **Grading policy** | | | | | | | | | | | | **Points** | | **Percentage** |
| Pre-exam activities | | | | | | | | | | | | | | |
| lecture/exercise attendance | | | | | | | | | | | | 10 | | 10% |
|  | | | | | | | | | | | |  | |  |
| colloquiums | | | | | | | | | | | | 40 | | 40% |
| Final exam | | | | | | | | | | | | | | |
| test | | | | | | | | | | | | 50 | | 50% |
|  | | | | | | | | | | | |  | |  |
|  | | TOTAL | | | | | | | | | | | | 100 | | 100% |
| **Certification date** | | 2023 | | | | | | | | | | | | | | |

1. Coefficient of student workload So is calculated as it follows:

   а) for the study programs not going through the licensing process: So = (total workload in semester for all the subjects 900 hrs – total teaching workload L+E in semester for all the subjects 870 hrs)/ total teaching workload L+E in semester for all the subjects \_\_\_\_\_ hrs = \_\_\_\_. Consult form content and its explanation.

   b) for the study programs going through the licensing process, it is necessary to use form content and its explanation. [↑](#footnote-ref-0)