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| <b>Study program:</b> Integrated Academic Studies in Dental Medicine  |
| <b>Course title:</b> Microbiology with Parasitology and Immunology  |
| <b>Teacher:</b> Ivana B. Hrnjaković Cvjetković, Gordana M. Smieško, Vera P. Gusman, Deana D. Medić, Anika Đ. Trudić   |
| <b>Course status:</b> compulsory  |
| <b>ECTS Credits:</b> 6  |
| <b>Condition:</b> Medical Biochemistry  |
| <b>Course aim</b><br>To achieve a comprehensive understanding of the facts in the field of study in order to connect and apply the theory and practice  |
| <b>Expected outcome of the course:</b><br>Theoretical preparation for the diagnosis and differential diagnosis<br>Preparing for work in practice, the choice of appropriate methods and their interpretation  |
| <b>Course description</b><br><i>Theoretical education</i><br>1. Background. Subject and objective study of microbiology. Classification and nomenclature of bacteria. The shape and size of bacteria. 2. Functional structure of the bacterial cell. Metabolism of bacteria 3. Multiplication of bacteria. Genetics of bacterial 4. Antimicrobial agents (antibiotics and chemotherapeutics). Mechanisms of bacterial resistance to antimicrobial drugs 5. Associations between microorganisms and higher living beings. Virulence factors 6. Mechanisms Defense integrity of the organism (and atypical). Infection. Mechanisms of defense against bacteria, viruses, parasites and fungi 7. Built and functional organization of the immune system. Regulation of immune responses. Specificity in immunology. Recognition of foreign (and own). Immunological memory. 8. Antigens and haptens. 9. Complement. Antibody against red blood cells anigena the 10th Cellular basis of immune reactivity. Cooperation cells in immune response. Antibody-dependent cellular cytotoxicity 11th Immunological Deficit (types and significance) 12. Antibody (immunoglobulins). Biological properties of antibodies and their significance. Methods of proving their 13. Sensitivity early types (mechanisms and manifestations) 14. Sensitivity late types (mechanisms and manifestations) 15. Transplant immunology 16. Hla complex man and the importance 17. Immunosuppression. Immune tolerance, immunodeficiency 18. Tumor immunity. The mechanism of immune surveillance 19. Mechanisms occurrence and types of autoimmune diseases. 20. Active and passive immunity (natural and artificial). Vaccines, Immunization (problems) 21 antibody-antigen reactions in diagnostic purposes. Immunological tests and their interpretation 22. Clinical bacteriology - the subject and objective of the study. Normal bacterial flora 23rd Staphylococcus. Streptococcus 24. Microorganisms in the mouth 25. Neisseria 26. Bacillus. Clostridia 27. Corynebacterium, Listeria 28. Micobacterium, Actinomyces, Nocardia 29. Familia Enterobacteriaceae. Escherichia. Other Enterobacteriaceae 30th Salmonella. 31. Pseudomonas 32. Homophiles Shigella, Legionella bordetella. Brucella 33rd Anaerobic gram-negative cast. Vibrio. Aeromonas; plesiomonas 34. Campylobacter, Helicobacter, Yersinia 35. Treponema. Borrelia, Leptospira 36. Mycoplasma, Ureaplasma 37. Rickettsia 38. Differences virus compared to other microorganisms and their importance in medicine 39. Virus particles - virion. Determining the shape and size of the virus. Electron microscope. Preparative methods in virology. Ultracentrifuge. Ultrafilters 40. chemical composition of the virus (viral proteins, viral nucleic acid, viral antigens). Hemagglutinin and viral hemagglutination 41. Viral infections. Pathogenesis of viral diseases. Syndrome manifestations of viral diseases 42. Stadiums multiplication of the virus. Selectivity and tropism virus 43. Genetics of viruses. Defective viruses. Prion. Variability of the virus 44. Associations of viruses (associated infections, interference and exaltation). Interferon (significance and application). Viral vaccines 45. Effect of physical and chemical agents and chemotherapeutics' (antiviral drugs). Principles of rational antiviral therapy 46. multiplying of viruses in the laboratory (cell culture, embryonized eggs and laboratory animals) 47. Etiological diagnosis of viral diseases. Serological methods (for verification to prove the antigen and antibody). Rapid diagnostic methods 48. Classification of viruses, the most important family of DNA and RNA viruses 49. Picornaviridae. Orthomyxoviridae 50. Paramyxoviridae. Rhabdoviridae 51. Togaviridae. Arbo viruses 52. Adenoviridae. Papillomaviridae and polyomaviridae, parvoviridae 53. Herpesviridae. Poxviridae 54. People with hepatitis. HIV- 55th Chlamydia 56. Introduction to Parasitology, classification. Protozoa and oral protozoan 57. Classis sarcomastigophora. Pneumocystis, Cryptosporidium 58. Plasmodium. Toxoplasma 59. Characteristics of helminthes. Trematoda. Cestoda. Nematoda 60. Medical mycology<br><br><i>Practical education</i><br>1. Rules of behavior in the microbiological laboratory. Sterilization and disinfection. 2. Mikroscope and work with a microscope. Microscopic examination of uncolored bacteria. Microscopic examination of colored bacteria 3. Cultural testing of bacteria. Variations of bacterial colonies. 4. Physiological-biochemical examination of bacteria. Serological and biological testing of bacteria. |

5. Examining sensitivity of bacteria to antimicrobial drugs 6. basic terms of antigens, antibodies and the creation of complex antigen-antibody (in vitro) the application of antibody-antigen reactions in diagnostic purposes (qualitative, quantitative and polukvantitativne reaction). 7. Agglutination (various techniques) precipitation (various techniques in liquid medium in the gel) 8. Complement (bacteriolysis and hemoliza). Immunological interpretation of the results of diagnostic tests and serological reactions. Determination of quantity of immunoglobulin and complement. Determining the efficiency of immunoprophylaxis 9. Staphylococcus. Streptococcus 10. Neisseria, moraxella 11. Mycobacterium 12. C corynebacterium 13. Family of 14. Escherichia. Enterobacteriaceae, Klebsiella 15. Salmonella. Shigella 16. Proteus, Providencia, Morganella 17. Pseudomonas, 18. Bacillus Campylobacter, Clostridium 19. Serological diagnosis of bacterial infections 20. Choice, taking and sending material for virological examination. Interpretation of results 21. Isolation of virus in cell cultures and 22. Electronic and immunoelectronic microscopy 23. Isolation virus in embrionisanim pigeon eggs 24. Isolations of the virus in laboratory animals. Selectivity and tropizam virus. Inclusion 25. Preparative methods in virology. Viral etiological hemaglutinacija 26. Sereological reactions and random specificity 27. Protozoa 28. Plasmodium, Toxoplasma 29. Helminths 30. Medical mycology.

**Literature**

*Compulsory*

1. Murray PR, Rosenth KS, Pfaller MA. Medical Microbiology, 7th Edition, Elsevier, 2017
1. Carol KC, Morse SA, Mietzner T, Miller S. Jawetz, Melnick & Adelbergs Medical Microbiology, 27th Edition, Mc Graw Hill Education, 2015

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|---------------------------------|--------------------------------|------------------------------|
| <b>Number of active classes</b> | <b>Theoretical classes: 60</b> | <b>Practical classes: 30</b> |
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**Teaching methods:** Lectures, practice.

| <b>Student activity assessment (maximally 100 points)</b> |               |                   |               |
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| <b>Pre-exam activities</b>                                | <b>Points</b> | <b>Final exam</b> | <b>points</b> |
| Lectures  | 5             | Written           | 60            |
| Practices   | 5             |                   |               |
| Colloquium  | 20 (2x10)     | .....             |               |
| Essay   | 10 (2x5)      |                   |               |