

Study Programme: Master Academic Studies of Biology
Course Unit Title: Antimicrobial agents
Course Unit Code: MB17
Name of Lecturer(s): Associate Professor Jelica Simeunović
Type and Level of Studies: Master degree- Module Microbiology
Course Status (compulsory/elective): Elective
Semester (winter/summer): Winter
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 7
Prerequisites: None
<p>Course Aims:</p> <p>The aim of the course is to familiarize students with the types of antimicrobial agents, mechanisms of action, the way of using them and the importance of their use in reducing the number and preventing the growth of microorganisms in different environments.</p>
<p>Learning Outcomes:</p> <p>After the successfully completed examinations, the student</p> <ul style="list-style-type: none"> - acquires knowledge about the importance of the use of antimicrobial agents (disinfectants, antiseptics and antibiotics); - can distinguish and correctly applies basic laboratory skills for establishing aseptic conditions in the laboratory and preventing the contamination of axenic cultures of microorganisms; - adequately uses techniques for manipulating with antimicrobial agents.
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Introduction to basic concepts in the control of microorganisms and types of antimicrobial agents and chemotherapeutics; Physical methods in controlling growth and the number of microorganisms in different environments; Chemical agents and their application in the control of growth of microorganisms (disinfectants and antiseptics); Methods of administration of antimicrobial agents: minimal inhibitory concentration (MIC), minimal bactericidal concentration (MBC), chemotherapeutic index (HI); The history of antibiotic discovery; The most important groups of conventional antibiotics: beta-lactam antibiotics, sulphonamides, aminoglycosides, glycopeptides, chloramphenicol, tetracyclines, quinolones, macrolides, lincosamides, polypeptides, polyenes, polymyxins; Mechanisms of bacterial resistance to antibiotics; The most important groups of antiviral agents; The most important groups of antifungal agents; Antimicrobial agents originating from microalgae, plants, animals; The most important groups of antibiotics-cytostatics and their mechanisms of action; Methods of testing the susceptibility of microorganisms to antimicrobial agents.</p> <p><i>Practice</i></p> <p>Techniques for the application of certain physical factors in growth control and the number of microorganisms - testing of high and low temperature effects on the growth of microorganisms; Investigation of the action of UV rays on the growth of microorganisms; Application of chemical methods in growth control and the number of microorganisms - testing the effects of heavy metals; Investigation of the functioning and efficacy of disinfectants and antiseptics on the growth of microorganisms; Microorganism susceptibility tests for conventional antibiotics - Antibigram tests; Determination of MIC and MBC values for individual antibiotic groups - disk diffusion and microdilution tests; Testing the combination of antibiotics in selected bacterial assays; Tests for the susceptibility of bacteria to antimicrobial compounds originating from microalgae and plants; Testing the action of antifungal agents on selected yeasts and molds.</p>
Required Reading:

1. Ola Sköld (2011): Antibiotics and antibiotic resistance. Wiley Inc., Hoboken, New Jersey, USA, ISBN: 978-0-470-43850-3.
2. Barry A.L., Craig W.A., Nadler H., Reller L.B., Sanders Ch.C., Swenson J.M. (1999): Methods for determining bactericidal activity of antimicrobial agents; approved guideline. NCCLS, Wayne, USA.
3. Madigan M.T., Martinko J.M., Parker J.: Brock Biology of Microorganisms, 11th Edition, 2006, Prentice Hall. (selected chapters)
4. Brown A.E.(2005): Benson's microbiological application, McGraw-Hill Companies, New York (selected chapters)
Norrel S.A. and Messley K.E. (1997): Microbiology, Laboratory manual, principles and applications. Prentice-Hall, Inc. Simon and Schuster, Viacom Company, New Jersey. (selected chapters)

Weekly Contact Hours: 15	Lectures:30	Practical work: 30
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Teaching Methods:

Lectures and students group work

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	Final exam	points
Active class participation	5	practical exam	-
Test	35	oral exam	60
Preliminary exam(s)	-	
Seminar(s)	-		

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.