

# MICROBIOLOGY 1

<b>Study program</b>	Veterinary Medicine
<b>Year of study</b>	I
<b>Semester</b>	II
<b>Regime of discipline</b>	DOB
<b>Category of discipline</b>	Dsf
<b>Number of lectures hours per week</b>	2
<b>Number of seminar/laboratory/project hours per week</b>	2
<b>Total number of hours according to the curriculum: lectures/seminars/laboratory/project</b>	28 hours of course/28 hours of laboratory
<b>Number of transferable credits</b>	4

## SPECIFIC SKILLS

<b>Professional Competence</b>	<p><b>C1</b> Acquiring knowledge on taxonomy and nomenclature of bacteria. Knowledge of bacteria morphology, the chemical structure of bacteria, bacteria metabolism, the relationship between physical and chemical factors and bacteria. Knowledge of appropriate techniques for morphological and cultural examination, isolation and identification of the main bacterial species with implications for the etiology of infectious diseases in animals.</p> <p>Understanding the growth, development and multiplication of pathogenic bacteria.</p> <p><b>C2</b> Knowledge of bacterial genetic elements and mechanisms that can produce genetic variations.</p> <p><b>C3</b> Apply gained knowledge to perform sterility smears under the various specific colorations to highlight the structural elements of bacteria,</p> <p><b>C4</b> Mastering the art of effecting and interpretation of antibiogram and biochemical reactions needed to guide the main techniques of bacteriological diagnosis</p> <p><b>C5</b> Mastering the art of cultivating bacteria and interpretation of bacterial load.</p> <p><b>C6</b> commonly used laboratory equipment necessary to perform microbiological laboratory diagnosis.</p>
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## LEARNING OUTCOMES

<b>Knowledge</b>	Knowledge of bacterial morphology, shape and grouping, bacterial metabolism, relationships between physical and chemical factors and bacteria. Understanding of the growth, development and multiplication of pathogenic bacteria for animals.
<b>Skills</b>	The student must master the work under sterile conditions, the technique of performing smears, the staining methods, the technique of examining smears, for the orientation of the bacteriological diagnosis. He must also know the technique of performing and interpreting the antibiogram and specific biochemical reactions.
<b>Responsibility and autonomy</b>	Responsible execution of practical bacteriology work under conditions of autonomy and familiarization with specific teamwork activities.

## COURSE OBJECTIVES

<b>General objective of the course</b>	To convey knowledge of the general characteristics of bacteria, bacterial morphology, morphochemical structure - of bacterial cell, bacterial metabolism, bacteria genetics
<b>Specific objectives</b>	<ul style="list-style-type: none"> <li>- Familiarize students with methods of sterilization and the importance of ensuring sterile conditions</li> <li>- Familiarize students with how sampling for bacteriological analysis and conduct follow. Mastery coloring techniques and cultivation of bacteria</li> <li>- To introduce students to the concepts of taxonomy and nomenclature of bacteria.</li> <li>- Presentation of the general concepts of bacterial morphology - the shape, the arrangement and dimensions</li> <li>- Acquiring the students the basics of morphological structure - chemical bacterial cell</li> <li>- To introduce students to aspects of bacterial metabolism</li> <li>- Understanding by students of the phenomena of bacterial growth and multiplication</li> <li>- To introduce students to aspects of bacterial genetics</li> </ul>

## COURSE CONTENT

LECTURES	Number of hours
Theme 1. Introduction. General Aspects of Microbiology. Short history of microbiology evolution	2
Theme 2. The Morphology and Fine Structure of Bacteria. General characteristic of bacteria. Bacterial forms, size and types of grouping	2
Theme 3. The morphology and fine structure of bacteria. Bacteria weight, density, volume and staining	2
Theme 4. Cell wall of bacteria. The cell wall of Gram-positive bacteria. The cell wall of Gram-negative bacteria.	2
Theme 5. The cytoplasm membrane. Cytoplasm. Nucleoid (Nucleus Equivalent)	2
Theme 6. Capsule and other extra-wall structures.	2
Theme 7. Flagella Attachment Pilli (Fimbriae), Conjugation Pilli. Bacterial Spores	2
Theme 8. The chemical structure of the bacteria. Nucleic acids. Plasmids	2
Theme 9. Bacterial enzymes (classification, structure and character	2
Theme 10. Bacterial Metabolism Nutritive requirements of bacteria. The carbohydrates, proteins and fat metabolism. The respiration reactions in bacteria	2
Theme 11. Bacteria growing and multiplication. The dynamic of bacteria multiplication in liquid culture media	2
Theme 12. The relation of the bacteria with the physique agent. The substances with unspecific and specific action on bacteria. The resistance to antibiotics	2
Theme 13. Microorganisms with specific structure: Mycoplasma, Rickettsia and Chlamydia	2
Theme 14. Bacterial Genetics. The Structure of Bacterial DNA. DNA Replication Transcription and Translation Regulation of Gene Expression The Genetic Variability of Bacteria	2
SEMINAR/LABORATORY	Number of hours
Laboratory 1. Summary of universal precautions and laboratory safety procedures Sterilization by physical and chemical methods	2
Laboratory 2. Microbiological culture media: preparation and sterilization	2
Laboratory 3. Techniques for inoculation, incubation, transplantation and isolation of pure cultures of bacteria. Methods for the preservation of bacterial strains	2
Laboratory 4. Criteria for identification of bacteria. Bacteria examination in native state	2
Laboratory 5. Technique of smears execution and examination	2
Laboratory 6. Usual methods of bacteria staining	2
Laboratory 7. Special methods of bacteria staining: Gram staining, Acid-Fast Staining (Ziehl-Neelsen Procedures)	2
Laboratory 8. Bacteria exam on staining smears. Types of groups on bacteria	2
Laboratory 9. Endospore staining, Capsule staining. Flagella staining	2
Laboratory 10. Methods of evidence of bacterial cilia. Determination of dimensions in bacteria	2
Laboratory 11. Determination of total numbers of colony unit forms	2
Laboratory 12. The effects of chemical agents on bacteria: antimicrobial agents	2
Laboratory 13. Determination of bacterial sensitivity to antibiotics and chemotherapeutic	2
Laboratory 14. Determinarea activității biochimice a bacteriilor	2

## BIBLIOGRAPHY:

- **Ileana Nichita** - General Bacteriology – Manual, Mirton, Timisoara, 2014, ISBN 978-973-53-1488-3
- **Prescott Harley** – Laboratory exercise in microbiology. Fifth edition, The McGraw–Hill Companies, 2002
- **Hawley Louise And Col.** - Kaplan Medical Microbiology, Immunology. USA, 2004

## ASSESSMENT

Activity type	Assessment criteria	Assessment methods	Percentage of final grade
<b>Lectures</b>	Communication of informations using the correctly scientific language used in the field of Microbiology.	Oral exam – 2 subjects	<b>60%</b>
	Knowledge of basic concepts and explain their discipline interdependencies Demonstration of a coherent and logic thinking in the exposure of an idea and the ability to apply theoretical knowledge to solve practical problems.		
	Application of theoretical acquisitions in conducting analyzes, in exercises and problems solving, in sustaining of some arguments, etc. Originality and correctness of answers used to build arguments pro / cons.		
<b>Seminar/laboratory/clinical sessions</b>	Using the microbiological knowledge in addressing inter-, intra-, multi and / or trans-disciplinary issues / problem situations	Periodic evaluation (through oral evaluation tests / written / practical) and presentations, individual	<b>30%</b>
	Using their procurement discipline in addressing inter-, intra-, multi-and / or trans-disciplinary issues / problem situations.	Examination for laboratory technics	
<b>Other activities</b>	The participation on course and in practical work		<b>10%</b>

**Course coordinator: Prof. PhD Ileana NICHITA**

**Practical activities coordinator L/S/P: S Lect. PhD Iulia-Maria BUCUR**