



SUBJECT OUTLINE

1. Information on the programme

1.1. Higher education institution	Iași University of Life Sciences
1.2. Faculty	Veterinary Medicine
1.3. Department	XI – Public Health
1.4. Field of study	Veterinary Medicine
1.5. Cycle of study ¹	Bachelor and Master (unitary study programme)
1.6. Specialization/ Study programme	Veterinary Medicine
1.7. Form of education	Full time

2. Information on the discipline

2.1. Name of the discipline		Microbiology I						
2.2. Course coordinator		Prof. Mihai Mareș DMV PhD						
2.3. Seminar/ laboratory/ project coordinator		Assist. Andra-Cristina Bostănar DMV PhD						
2.4. Year of study	II	2.5. Semester	3	2.6. Type of evaluation	Exam	2.7. Discipline status	Content ²	CS
							Compulsoriness ³	CD

3. Total estimated time (teaching hours per semester)

3.1. Hours per week – full time programme	4	out of which: 3.2. lecture	2	3.3. seminar/ laboratory/ project	2
3.4. Total number of hours in the curriculum	56	Out of which: 3.5. lecture	28	3.6. seminar/laboratory	28
Distribution of the time allotted					hours
3.4.1. Study based on book, textbook, bibliography and notes					24
3.4.2. Additional documentation in the library, specialized electronic platforms and field					6
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					13
3.4.4. Tutorials					-
3.4.5. Examinations					1
3.4.6. Other activities					-
3.7. Total hours of individual study	44				
3.8. Total hours per semester	100				
3.9. Number of credits ⁴	4				

4. Prerequisites (is applicable)

4.1. curriculum-related	Biochemistry, Cell Biology
4.2. skills-related	The student must have knowledge regarding microscopic examination (using an optic microscope)

5. Conditions (if applicable)

5.1. for the lecture	The course is interactive; students can ask questions regarding the content of the presentation.
5.2. for the seminar/ laboratory/ project	At practical work is required to study the materials presented during the lectures; each student will conduct an individual activity using the laboratory materials provided. Laboratory meeting begins with a short discussion having as topics the material taught in the previous courses and laboratories. All live microbial cultures and microscopical examinations will be done at the recommendation and under the supervision of the teaching staff.

6. Specific competences acquired

Professional competences	<p>Properly prepare and view specimens for examination using microscopy.</p> <p>Use pure culture and selective techniques to enrich for and isolate microorganisms.</p> <p>Use appropriate methods to identify microorganisms (media-based, molecular and serological).</p> <p>Estimate the number of microorganisms in a sample (using, for example, direct count, viable plate count, and spectrophotometric methods).</p> <p>Use appropriate microbiological and molecular lab equipment and methods.</p> <p>Practice safe microbiology, using appropriate protective and emergency procedures.</p>
Transversal competences	<p>Development of medical thinking and analysis: examination, diagnosis, working in a team. Take part in self-audit and peer-group review processes in order to improve performance. Understand the contribution that imaging and other diagnostic techniques can make in achieving a diagnosis. Use basic imaging equipment and carry out an examination effectively as appropriate to the case, in accordance with good health and safety practice and current regulations. Apply principles of bio-security correctly.</p>

7. Course objectives (based on the list of competences acquired)

7.1. Overall course objective	<ul style="list-style-type: none"> - Acquiring knowledge in general microbiology (viruses, bacteria, fungi, biofilms) - Learning of bacterial morphology, physiology, and multiplication - Acquiring the ability to perform and interpret the laboratory tests (staining, biochemical tests, microbial enumeration etc.) - Acquiring knowledge on the antimicrobial susceptibility testing
7.2. Specific objectives	<p>Principles in studying microorganisms (morphology, biochemical properties, enumeration). Methods to evaluate the antimicrobial susceptibility of clinical isolates.</p>

8. Content semester I

8.1 Lectures – 28 hrs	Teaching methods	Observations
Introduction. Definition and importance of microbiology. The world of microorganisms; interdisciplinary connections.	Ppt. presentations, Q&A	1 lecture (2 hrs)
Functional anatomy of bacteria. Bacterial protoplast; Bacterial cell wall; Motility organelles; slime; pili; endospores; “L” forms.		1 lecture (2 hrs)
Nutrition, metabolism, and bacterial growth; Basic nutritional requirements; growth factors; culture media.		1 lecture (2 hrs)
Environmental factors affecting the bacterial growth (temperature, pH, O ₂ , CO ₂ , osmotic pressure), microbial growth kinetics		1 lecture (2 hrs)
Microbial genetics. Bacterial genome. Mutations. Genetic recombinations in bacteria (transformation, conjugation, transduction)		1 lecture (2 hrs)
Viruses. Generalities; structure, classification; pathogenicity; Viroids and Prions.		1 lecture (2 hrs)
Microorganism-host interactions; Microbial colonization; The microbiome; dysbiosis;		1 lecture (2 hrs)
Mechanisms of pathogenicity (virulence factors: adhesins; capsule; toxins). Biofilms – definition, structure, medical importance.		1 lecture (2 hrs)
Control of microorganisms. Microbiological basis of infection prevention; neutralizing the source of infection; interrupting the transmission routes; protection of the susceptible host.		1 lecture (2 hrs)
The effect of physical and chemical agents against the microorganisms; (definition, dry heat, wet heat, cold, dehydration, osmotic pressure; radiations)		1 lecture (2 hrs)
Antiseptics and disinfectants		1 lecture (2 hrs)
Antibiotics. Mechanisms of resistance to antibiotics.		2 lectures (4 hrs)
Etiotropic therapy set-up. Antimicrobial susceptibility testing		1 lecture (2 hrs)

8.2 Practical sessions – 28 hrs	Teaching methods	Observations
Microbiology lab set-up. Biosafety rules; Microscopy techniques	Ppt. presentations, microscopical examination of fungal cultures, histological examinations, clinical cases, short tests, Q&A	1 Practical session (2 hrs)
Bacterial morphology and staining: Smear preparation; Methylene blue and Giemsa stains		1 Practical session (2 hrs)
Bacterial morphology and staining: Gram stain.		1 Practical session (2 hrs)
Bacterial morphology and staining: Ziehl-Nelsson stain, special stains for capsule and endospores		1 Practical session (2 hrs)
Infection control. Physical and chemical agents of disinfection		1 Practical session (2 hrs)
Preparation and sterilization of the culture media. Types of culture media used in clinical laboratories		1 Practical session (2 hrs)
Culture transfer instruments, techniques, and isolation of bacteria (both aerobic and anaerobic); Maintenance of pure cultures		1 Practical session (2 hrs)
Determination of Bacterial Numbers		1 Practical session (2 hrs)
Biochemical activities of bacteria		2 Practical sessions (4 hrs)
Identification of bacteria		1 Practical session (2 hrs)
Antimicrobial susceptibility testing (Kirby-Bauer method)		2 Practical sessions (4 hrs)
Evaluation of laboratory skills		1 Practical session (2 hrs)
Compulsory bibliography:		
1. PowerPoint Presentations of Weekly lectures – Mihai Mareş		
2. Harley – Prescott: Laboratory exercises in microbiology; 5 th edition; The McGraw–Hill Companies, 2002.		
Optional bibliography:		
1. Quinn P J et al. – Veterinary Microbiology and Microbial Diseases; 2 nd edition; Wiley-Blackwell; 2011.		

9. Corroborating the course content with the expectations of the epistemic community representatives, of the professional associations and of the relevant employers in the corresponding field

In order to improve the content and the teaching/learning methods, the discipline holders participated in European vocational training programs (POSDRU), have met with members of the professional communities in Romania, as well as with other teachers in the field, representatives of other higher education institutions in the country and the European Union (Erasmus mobility). The meetings aimed to identify the needs and expectations of employers in the field and harmonizing curriculum with other similar programs within other higher education institutions in Europe. The discipline content is developed in correlation with necessary requirements for "day one competences" and "year one skills"

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	<ul style="list-style-type: none"> - Impact of microorganisms on the biosphere, humans, and animals; microbial diversity. - Microbial cell biology, including cell structure and function, growth and division, and metabolism. - Microbial genetics, including mutations. - Interactions of microorganisms with hosts (humans, other animals, plants), including pathogenicity mechanisms and antimicrobial agents 	Oral exam	60 %
10.5. Seminar /Laboratory	<p>A student successfully completing basic microbiology will demonstrate the ability to:</p> <ol style="list-style-type: none"> 1. Use a bright-field light microscope to view and interpret slides; 2. Properly prepare slides for microbiological examination; 3. Properly use aseptic techniques for the transfer and handling of microorganisms and instruments; 4. Use appropriate microbiological media and test systems; 5. Estimate 	Short tests and seminars (Q&A) Practical exam (Evaluation of the laboratory skills)	40 %

	the number of microorganisms in a sample using serial dilution techniques; 6. Use standard microbiology laboratory equipment correctly.		
10.6. Minimum performance standards			
Functional anatomy of microorganisms, bacterial metabolism and growth, Antisepsis and disinfection, Antimicrobial agents and antimicrobial resistance; ability to perform basic laboratory tests and procedures.			

Date
14.09.2021

Course coordinator
Prof. Mihai Mareş PhD DVM



Laboratory sessions coordinator
Assist. Andra-Cristina Bostănaru DVM
PhD



Head of the Department
Assoc. Prof. Viorel-Cezar Floriştean DVM PhD

