

General information	
Academic subject	<b>MICROBIOLOGY AND APPLIED IMMUNOLOGY</b>
Degree course	Animal Science L38
Academic Year	2022/2023 - II year
European Credit Transfer and Accumulation System (ECTS)	8
Language	Italian
Academic calendar (starting and ending date)	I Semester
Attendance	Mandatory

Professor/ Lecturer	
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Department and address	Campus of Veterinary Medicine, S.P. 62 to Casamassima km 3, 70010 Valenzano (Ba)
Virtual headquarters	Microsoft Teams platform if necessary (Teams Code: r2zr5zh)
Tutoring (time and day)	Tuesday 10:30-12:30; Thursday 14:30-16:30

Syllabus	
<b>Learning Objectives</b>	Acquisition of in-depth knowledge of the morphological, biological and pathogenetic characteristics of bacteria and viruses, of the functions of the immune system, and of type of vaccines
<b>Course prerequisites</b>	Students must have passed the examination of Zoology, Histology and Anatomy, and the examination of Principles of Physiology and Endocrinology of Domestic Animals. Students must have acquired knowledge and skills relating to the different anatomical districts, the biochemical and physiological mechanisms that regulate cellular functions and blood and lymphatic compartments ones.
<b>Contents</b>	<p><b>Bacteriology:</b> Prokaryotes (Archaea and Bacteria) and Protists (Eucarya). Optical and fluorescence microscopes. Main sterilization and disinfection systems. General information on bacteria. Structure of the bacterial cell. Bacteria stains. Bacterial growth factors. Bacterial growth curve. Bacteria cultivation and identification techniques. Pathogenic properties of bacteria. Bacterial genetics: chromosomes and plasmids, mutations, transformation, conjugation, transduction, phage conversion. Mechanism of action of antibiotics. Antibiotic resistance. Laboratory techniques for the diagnosis and identification of bacteria. Systematic bacteriology: main bacteria of medical-veterinary interest.</p> <p><b>Virology:</b> General information on viruses. Structure and physical-chemical characteristics of viruses. Replication of DNA and RNA viruses. Virus cultivation. Cytopathic effects. Virus titration. Viral genetics. Bacteriophages: morphology, lytic cycle and lysogenic cycle. Virus-host relationship and pathogenesis of viral infections. Prions. Laboratory techniques for the diagnosis and identification of viruses. Systematic virology: main viruses of medical-veterinary interest.</p> <p><b>Immunology:</b> Natural immunity: physical-chemical barriers, complement system, interferon, phagocytosis. Passive immunity: immune sera and colostrum. Active immunity: primary and secondary lymphoid organs, myeloid and lymphoid cells, antigens and haptens, antibodies, humoral and cell-mediated immunity. Principles of immunopathology. Hypersensitivity (I, II, III, IV type). Vaccines.</p> <p><b>Laboratory:</b></p>

	<p>Organization and instruments of a microbiology laboratory          Identification and cultivation of viruses and bacteria          Molecular biology          Serological diagnosis</p>
<b>Books and bibliography</b>	<ul style="list-style-type: none"> <li>• Poli G., Microbiologia ed Immunologia Veterinaria, Edra S.p.A., third edition 2017</li> <li>• González J.R.R., Larrea C.L., Rodríguez S.G., Naves E.M., Immunologia. Biologia e patologia del sistema immunitario, Piccin Editore, 4° edition 2012</li> <li>• Murphy K., Immunobiologia di Janeway, Piccin Editore, 8° edition 2012</li> <li>• Notes from the lessons</li> <li>• Lectures notes on bacteriology by Professor M. Corrente</li> </ul>
<b>Additional materials</b>	

<b>Work schedule</b>			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
<b>Hours</b>			
<b>200</b>	<b>70</b>	<b>25</b>	<b>105</b>
<b>ECTS</b>			
<b>8</b>	<b>7</b>	<b>1</b>	
<b>1 Teaching strategy</b>			
<p>The course includes frontal teaching for the acquisition of knowledge and practical teaching for the application of knowledge. Theoretical lessons are held through the use of Power Point presentations in classrooms equipped with multimedia tools such as PC, projector and internet connection.</p> <p>Practical lessons take place in the suitably equipped laboratories of the Infectious Diseases section of the Veterinary Medicine Department. Students, divided into groups, are supervised by the subject teacher and collaborators. Students are invited and urged to individually carry out the laboratory techniques covered by the exercise and to discuss with teacher or collaborators. The course is not delivered in e-learning mode (with the exception of health emergencies).</p>			
<b>Expected learning outcomes</b>			
<b>Knowledge and understanding on:</b>	The student must acquire specific skills in bacteriology, virology and immunology, mandatory for the study of the prophylaxis of infectious diseases.		
<b>Applying knowledge and understanding on:</b>	The student must know good laboratory practices, and the main diagnostic procedures both for the diagnosis of bacterial and viral infections, and for serological investigations. The student must also be able to understand how microorganisms interact with the environment and carry out their pathogenic action towards the host.		
<b>Soft skills</b>	<ul style="list-style-type: none"> <li>• <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> <li>○ At the end of the course, the student must be able to independently make choices and choices in the field of microbiology</li> </ul> </li> <li>• <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ At the end of the course, the student must demonstrate mastery of scientific language, and knowledge of the principles of microbiology and of the mechanisms that regulate the microbial world and the immune response</li> </ul> </li> <li>• Capacities to continue learning</li> </ul>		

	<ul style="list-style-type: none"> <li>○ At the end of the course, the student must be able to describe the characteristics and pathogenic properties of viruses and bacteria, and the main mechanisms of the immune response.</li> </ul>
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<b>Assessment and feedback</b>	
Methods of assessment	Knowledge is verified through an oral test on the topics of the program. The student must demonstrate mastery of scientific language, knowledge of the principles of microbiology, of the mechanisms that regulate the microbial world and of the immune response.
Evaluation criteria	<ul style="list-style-type: none"> <li>• <i>Knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ The assessment of knowledge and understanding is based on the assessment of the ability to organize the knowledge of the topics.</li> </ul> </li> <li>• <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ The assessment of applied knowledge and understanding is based on the assessment of the skills acquired for the practical application of laboratory techniques</li> </ul> </li> <li>• <i>Autonomy of judgment</i> <ul style="list-style-type: none"> <li>○ The evaluation of the student's independent judgment is based on the ability to critically discuss on the topics presented.</li> </ul> </li> <li>• <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ The assessment of communication skills is based on the quality of the exposure, its effectiveness and linearity, and on the competence in the use of technical/scientific language.</li> </ul> </li> <li>• <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>○ The assessment of the capacities to continue learning is based on the evaluation of the time taken to prepare for the exam.</li> </ul> </li> </ul>
Criteria for assessment and attribution of the final mark	The final grade is awarded out of thirty. The exam is passed when the grade is greater than or equal to 18/30. The transversal competences foreseen in the learning outcomes affect the final evaluation, therefore to achieve a high evaluation the student must have developed autonomy of judgment and adequate capacity for argumentation and presentation. Knowledge of immunology is preparatory to continue the exam. The assignment of honors is subjected to demonstration of critical reasoning skills on the topics presented and skills in the use of an appropriate scientific language.
<b>Additional information</b>	