

**ACADEMIC YEAR 2023/2024**

<b>General information</b>	
Academic subject	<b>VETERINARY MICROBIOLOGY AND IMMUNOLOGY</b>
Degree course	Veterinary Medicine LM42
Academic Year	II
European Credit Transfer and Accumulation System (ECTS)	4 (3 ECTS: lectures; 1 ECTS: practical activities)
Language	ITALIAN
Academic calendar	III 7 week period
Attendance	MANDATORY

<b>Professor/ Lecturer</b>	<b>Email address</b>	<b>Telephone nr.</b>
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Department and address	Campus of Veterinary Medicine, SP62 per Casamassima km 3, 70010, Valenzano
Virtual headquarters	Teams platform "Microbiologia ed Immunologia Veterinaria 2023/2024 (access code <b>rh9xm3x</b> )
Tutoring (time and day)	Tuesday-Friday 11.00-13.00/15.00-17.00, Teams platform "Attività tutoria Microbiologia" (access code <b>vavfapg</b> ) by appointment via email

<b>Syllabus</b>	
<b>Learning Objectives</b>	The course provides the essential and fundamental elements of knowledge of the microbial world, the interrelationships of microorganisms with the host and the tools and methods of response and defence of the immune system; it provides applications of immunology; it introduces the student to the microbiological terminology
<b>Course prerequisites</b>	The student must have acquired knowledge and skills relating to the anatomical districts, the biochemical and physiological mechanisms that regulate cellular functions and the blood compartment. Prerequisites: Physiology 1
<b>Contents of the course: Veterinary Microbiology and Immunology</b>  <b>teacher: Maria Tempesta</b>  <b>Lectures ECTS CFU: 3</b>  <b>hours: 39</b>	The course concerns the Basic Science area.  Importance of microbiology and immunology in the acquisition of skills for the future veterinary profession and cultural background <b>Bacteriology:</b> Generalities on bacteria. Differences between eukaryotes and prokaryotes. Microscopy. Structure of the bacterial cell. Bacterial stainings. Bacterial multiplication. Bacterial growth factors. Bacterial growth curve. Pathogenic properties of bacteria. Bacterial genetics. Antibiotic resistance. Resistance of bacteria to physico-chemical agents. Sterilization. Disinfection. <b>Systematic bacteriology:</b> Classification of the main germs of medical-veterinary interest. <b>Virology:</b> General information on viruses. Structure of viruses. Composition and physico-chemical characteristics of viruses. Virus replication. Virus cultivation. Cytopathic effects. Types of Infection. Viral genetics. Bacteriophages: morphology, lytic and lysogenic cycles. Resistance to physico-chemical agents. Prions. <b>Systematic virology:</b> DNAvirus: Adenoviridae; Parvoviridae; Herpesviridae; Poxviridae. RNAvirus: Picornaviridae; Coronaviridae; Togaviridae; Flaviviridae; Caliciviridae; Paramyxoviridae; Orthomyxoviridae; Rhabdoviridae; Reoviridae;



<p><b>Practical activities</b></p> <p><b>ECTS: 1</b></p> <p><b>Hours: 15</b></p>	<p>Retroviridae.</p> <p><b>Immunology:</b> Immunity and immune response. Lymphoid organs. Antigens and allergens. Aptens. Cells of the immune system. Antibodies. Components of the Innate immunity and mechanisms. Humoral immunity. Cell-mediated immunity. Mucosal immunity. Hypersensitivity (I, II, III, IV type). Passive immunity. Vaccines and vaccinations.</p> <p><b>Bacteriology:</b> (groups of 8-10 students) Sampling; staining; bacteriological media; cultivation and identification of bacteria; antibiogram test.</p> <p><b>Virology:</b> (groups of 8-10 students) Virus cultivation; cell cultures; virus titration: hemoagglutination test; plate method; end-point method.</p> <p><b>Serological tests:</b>(groups of 8-10 students) Rapid seroagglutination. Agar Gel Immunodiffusion. Immunofluorescence test. Inhibition of hemagglutination test. Seroneutralization test. Elisa test. Sampling.</p> <p><b>Molecular biology diagnostic techniques:</b>(groups of 8-10 students) PCR</p>
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<p><b>Biosafety rules for the attendance of practical activities</b></p>	<p>Access to the laboratories of the Infectious Diseases section of DiMeV is allowed only to students equipped with protective clothing (gowns and disposable latex gloves), who have read the biosafety manual.</p>
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<p><b>Personal study material</b></p> <p><b>Books and bibliography</b></p>	<p>Poli G, Dall'Ara P, Martino PA, Rosati S e coll. Microbiologia ed immunologia veterinaria, 3° ed. Edizioni EDRA S.p.A. Milano, 2017.</p> <p>Jawetz, Melnick, Adelberg's, Microbiologia medica, 25° Ed., Piccin Editore, 2011.</p> <p>Tizard IR, Veterinary Immunology, Elsevier 10th ed, 2017</p> <p>Notes taken during lectures.</p> <p>Slides projected during the lectures (available on google drive platform or team classroom). Handbooks of special bacteriology by Professor Corrente and special virology by Professor Tempesta (available on google drive or Teams classroom)</p>
<p><b>Additional materials</b></p>	<p><a href="https://talk.ictvonline.org/">https://talk.ictvonline.org/</a> for more information on virus taxonomy</p> <p>Additional teaching material is provided by the teacher at the beginning of the course and is available on the TEAMS platform</p>

<b>Work schedule</b>			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Self-study hours
<b>Hours</b>			
100	39	15	46
<b>ECTS</b>			
4	3	1	
<b>Teaching strategy</b>			
<p>The course consists of theoretical lectures and practical works in the laboratory. The theoretical part of the course takes place in classrooms equipped with multimedia tools such as pc, projector, internet connection, using power point slides and video. During the course, self-assessment questionnaires will be administered to verify learning. In the same way, innovative and interactive methods are used such as group quizzes (Kahoot!) to develop students' critical and deductive sense and specific and transversal competencies. The practical trainings focus on serological tests, bacteriology stains, cultivation and identification of bacteria and viruses,</p>			

	<p>antibiogram and viral titration. The practical works are conducted in the various laboratories suitably equipped in the infectious disease section. To access it, students, aware of the biosecurity standards, must be equipped with their own disposable gown and gloves and disposable masks and caps (these last disposables protective equipment is supplied by the Department). Students divided into small groups of a maximum of 10 units are followed by the subject teacher and collaborators. After having learned the concepts and aims of the methods from the teacher, each student is asked to carry out the laboratory techniques individually or in groups and to discuss their interpretation to develop communication skills and the ability to work in a team.</p> <p>The course is not delivered in e-learning mode.</p>
<b>Expected learning outcomes</b>	
<b>Knowledge and understanding on:</b>	<p>At the end of the course the student must know:</p> <ul style="list-style-type: none"> <li>○ the basic principles of bacteriology, virology, and immunology essential to the study and understanding of infectious diseases and prophylaxis plans.</li> <li>○ diagnostic laboratory techniques and good laboratory practices and sampling methods</li> </ul>
<b>Applying knowledge and understanding on:</b>	<p>At the end of the course the student must acquire:</p> <ul style="list-style-type: none"> <li>○ the ability to relate the characteristics of microorganisms with the capabilities of interrelation with the external and host environment and knowing how to apply them in the diagnostic and prophylactic approach to infectious diseases.</li> <li>○ the ability to collect, store and process biological samples and send them appropriately to the laboratory (DOC 1.21)</li> <li>○ the ability to perform the common serological and microbiological diagnostic techniques, know how to apply them in an appropriate way, know how to interpret and discuss the results with interlocutors, even non-specialists</li> <li>○ The ability to apply biosecurity principles correctly, including sterilization of equipment and disinfection of clothing (DOC 1.28)</li> </ul>
<b>Soft skills</b>	<p><b>Making informed judgments and choices</b></p> <p>At the end of the course, the student must be able to:</p> <ul style="list-style-type: none"> <li>○ acquire the fundamental and essential bases of microbiology that can allow him/her to face and solve problems of an infectious nature both from an epidemiological, diagnostic and prophylactic point of view;</li> <li>○ know and apply the research methods and contribution of basic and applied research to veterinary science;</li> <li>○ know the principles of disease prevention and the promotion of health and welfare;</li> <li>○ think and discuss;</li> <li>○ work both independently and as part of a team;</li> <li>○ solve problems by applying knowledge;</li> <li>○ search and manage information related to veterinary practice;</li> <li>○ use information in a foreign language;</li> <li>○ obtain adequate, diverse and updated information by various means such as literature and Internet information, and critically analyse it.</li> </ul> <p><b>Communicating knowledge and understanding</b></p> <p>At the end of the course, the student must be able to:</p> <ul style="list-style-type: none"> <li>○ communicate with exact terminology, with mastery of language and matter, on topics related to the host-pathogen relationship and the</li> </ul>



	<p>immune response in the epidemiological and prophylactic field (DOC 1.4)</p> <ul style="list-style-type: none"> <li>○ make a clear, concise, and consistent public presentation;</li> <li>○ ability of working in team, applying appropriate communication and interaction strategies (DOC 1.6)</li> </ul> <p><b>Capacities to continue learning</b></p> <ul style="list-style-type: none"> <li>• At the end of the course, the student must be able to: <ul style="list-style-type: none"> <li>○ know and apply a scientific methodological rigor to approach subsequent studies and in the veterinary profession</li> <li>○ be aware of the need to keep professional skills and knowledge up-to-date through a process of lifelong learning (DOC 1.13)</li> </ul> </li> </ul>
<p><b>Summary of the knowledge and competences that the integrated course concurs to let the students acquire (Day One Competences) as scheduled by EAEVE</b></p>	<p><b>Applying knowledge and understanding:</b></p> <p>1.4 1.6 1.13 1.21 1.28</p>

<b>Assessment and feedback</b>	
<p>Methods of assessment</p>	<p>Exam takes place through a preparatory (propaedeutic) practical laboratory test on topics covered in the practical works and an oral test on program topics. The practical part assessment is passed with a score grade ranging from 18 to 30L and can be taken separately from the oral part; the student's booking and the result are reported on the ESSETRE portal as partial test (not verbalizable); the exam must be completed by January of the following year, under penalty of forfeiture of the validity of the outcome of the practical test. During the oral exam the student will be asked questions (usually 6) of special and general bacteriology and virology and questions of immunology (at least 2).</p>
<p>Evaluation criteria</p>	<p>During the assessment procedure, students must demonstrate:</p> <ul style="list-style-type: none"> <li>• <b>Knowledge and understanding (score 1 to 8 points)</b> <ul style="list-style-type: none"> <li>○ knowledge of the mechanisms that regulate the microbial world and the immune response;</li> <li>○ insight into with the concepts and methodologies used in diagnostic techniques.</li> </ul> </li> <li>• <b>Applying knowledge and understanding (score 1 to 8 points)</b> <ul style="list-style-type: none"> <li>○ the skills acquired during the practical exercises and the knowledge of the principles of microbiology;</li> <li>○ the ability to choose and apply the best laboratory techniques for the isolation and cultivation of microorganisms of veterinary interest;</li> <li>○ to be able to explore the different topics on the program by relating the characteristics of the different microorganisms with the different infections and types of immune response;</li> <li>○ the knowledge of the basic concepts of vaccinology.</li> </ul> </li> <li>• <b>Autonomy of judgment (score 1 to 8 points)</b> <ul style="list-style-type: none"> <li>○ to be able to think transversally by correlating notions acquired in previous and preparatory courses;</li> <li>○ to have analytical skills and a critical sense with respect to the topics</li> </ul> </li> </ul>



	<p>covered.</p> <ul style="list-style-type: none"><li>• <b>Communication skills (score 1 to 3 points)</b><ul style="list-style-type: none"><li>○ Particular attention will be paid to the quality of the presentation of the topics, the use of scientific terminology and the mastery of language.</li></ul></li><li>• <b>Capacities to continue learning (score 1 to 3 points)</b><ul style="list-style-type: none"><li>○ The student must demonstrate that he has assimilated and understood the fundamental concepts of microbiology in order to use them for subsequent studies.</li></ul></li></ul>
Criteria for assessment and attribution of the final mark	In the oral test, according to the evaluation criteria, more attention will be given to the answers given to the immunology questions. Failure to answer questions, even those of systematics, will negatively affect, even significantly, the final grade and the outcome of the exam. The ability to relate the various topics of the program with a critical sense, the ability to communicate, the clarity of presentation, the disciplinary competence and the level of detail as well as the language ability will have a significant impact on the attribution of the final grade and on the outcome of the exam.
<b>Additional information</b>	To access the attribution of the attendance signature and to be able to access the exam, students must attend 70% of the theoretical lessons and 70% of the practical trainings.