

General information	
Academic subject	PARASITOLOGY, MYCOLOGY AND MANAGEMENT OF SINANTROPIC ANIMALS
Degree course	Animal Science L 38
Academic Year	2021/2022
European Credit Transfer and Accumulation System (ECTS)	9
Language	Italian
Academic calendar (starting and ending date)	I semester (10/04/2021-01/28/2022)
Attendance	Compulsory

Professor/ Lecturer	
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Virtual headquarters	Microsoft Teams (CODE: k5twsl6)
Tutoring (time and day)	Monday and Wednesday, From 2:30 pm to 4:30 pm

Syllabus	
Learning Objectives	<p>The goals of this teaching activities are</p> <ul style="list-style-type: none"> the acquisition of general concepts and theoretical bases relating to taxonomy, morphology, biological cycle of the main parasites and fungal microorganisms causing diseases in pets, livestock and wild animals as well as their epidemiology, clinical manifestations, diagnosis and prophylaxis. 2) the acquisition of technical and professional skills useful for assessing the impact of fungi and parasites on animal welfare through a correct diagnosis, a prompt treatment as well as prophylaxis plans for the correct management of pets, livestock and synanthropic animals.
Course prerequisites	“Principles of physiology and endocrinology of domestic animals”. In addition, the student must have basic notions of biology and immunology
Contents	<p>Course program</p> <p>The teaching contents will be divided into three modules: Parasitology, Parasitic Diseases and Mycology.</p> <p>Parasitology (20 hrs lectures and 10 hrs practical activities)</p> <p>General aspects on parasites and vectors and their interactions with hosts. Parasites and parasitism. Elements of taxonomy, morphological characteristics and biological life cycles of:</p> <p>Protista: (Sarcocystidophora; Apicomplexa). Animalia: Platyhelminthes, Digenea, Cestoda (Cyclophyllidae and Pseudophyllidae). Nematoda (Strongylida, Ascaridida, Rhabditida, Spirurida e Trichocephalida). Insecta: Diptera (Nematocera) e Siphonaptera (Fam. Pulicidae). Arachnida: Ixodida.</p>

	<p>Parasitic diseases (30 hrs lectures) Definition of parasitic disease. Damage caused by parasites to livestock. Role of parasitic populations on animal welfare and on quantitative-qualitative food production. Socio-economic aspects of parasitic diseases. Protozoan diseases: Babesiosis, Coccidiosis, Toxoplasmosis, Neosporosis, Giardiasis, Cryptosporidiosis and Trypanosomosis, Leishmaniasis. Flatworm diseases: Dicrocoeliosis, Fasciolosis and Paramphistomatosis. Infestation by larval stages (metacestodes) and adult cestodes. Nematode diseases: Ascariidosis, Ancylostomosis, broncho-pulmonary Strongilosis and gastrointestinal and intestinal strongilosis of ruminates and equines respectively. Thelaziosis. Arthropod-borne diseases: Flea Infestation, Tick infestation and tick-borne diseases (TBDs). <i>Phlebotomus</i> spp. and culicids. Main parasitic zoonoses. Laboratory diagnosis: detection of haemoprotozoa, coprological diagnosis, qualitative and quantitative methods (i.e., traditional and innovative techniques such as Flotac group. Morphological identification of ticks and insects of veterinary concern. Prophylaxis and control measures of fungal and parasitic diseases. Health education.</p> <p>Mycology (30 hrs lectures and 10 hrs practical activities) Introduction of mycology: Fungi: yeasts and moulds: The fungal cell. Vegetative system. Type of Reproduction: sexual spores, conidia of asexual origin. Fungi Classification: Zygomycetes, Ascomycetes and Basidiomycetes. The yeasts. Fungi and Lifestyle. Pathogenesis and host risk factors. The diagnosis of fungal infections. Cutaneous, subcutaneous and deep mycoses. Mycoses of veterinary interest: Malassezia infections, Dermatophytosis, Sporotrichosis, Mycetomas, Feifomycosis, Cryptococcosis and Aspergilloisfungi, Pathogenesis of infections: host risk factors, Virulence factors of fungi. Diagnosis of fungal infections: clinical diagnosis, sampling and laboratory diagnosis. Therapy and antifungal <i>in vitro</i> tests. The cutaneous mycoses: <i>Malassezia</i> spp and <i>Candida</i> spp infection; Dermatophytoses. Subcutaneous mycoses: Sporotrichosis, Mycetoma, Hyalophomycosis, Phaeohyphomycosis. Deep mycoses: Cryptococcosis and Aspergillois.</p>
<p>Books and bibliography</p>	<p>-Taylor M.A., Coop R., Wall R., "Parassitologia e Malattie Parassitarie degli Animali", Edizione italiana, EMSI, (2009). -Petretti F. "Gestione della fauna" Edagricole (2003). A.V. "Gestione e protezione del patrimonio faunistico" Editore a cura dell'Istituto per la qualificazione e l'aggiornamento tecnico professionale in agricoltura- Brescia, Volume 32. Atti I e II Corso di Aggiornamento Brescia, 1989-1990. -Ambrosi M. "Parassitologia zootecnica", Edagricole, (1995). -AA.VV. Parassitologia dei ruminanti. Summa. Anno XV, n° 9, 1998. -Polonelli L., Ajello L., Morace G., (1994) Micologia medica Eusculapio Editore, Bologna. -de Hoog G.S. and Guarro J., (1996), Atlas of clinical fungi, edit by de Hoog G.S. & Guarro J., Centraal bureau voor Schimmel cultures Baarn and Delft, The Netherlands. Students will be provided with didactic and photographic material (http://www.bariparasitology.it/pagina-Gallery.html), lecture notes (http://www.bariparasitology.it/materiale.html), study readings in Italian (https://www.vetjournal.it/riviste.html) and English (https://www.ncbi.nlm.nih.gov/pubmed). Students will be provided with didactic and photographic material (http://www.bariparasitology.it/pagina-Gallery.html), lecture notes (http://www.bariparasitology.it/materiale.html), study readings in Italian (https://www.vetjournal.it/riviste.html) and English (https://www.ncbi.nlm.nih.gov/pubmed). Prof. Claudia Cafarchia (www.bariparasitology.it). Riccardo Paolo Lia lecture notes</p>

				Diagnosi di laboratorio delle principali malattie degli animali domestici ((www.bariparasitology.it).			
Additional materials							
Work schedule							
Total	Lectures		Hands on (Laboratory, working groups, seminars, field trips)		Out-of-class study hours/ Self-study hours		
Hours							
105	80		25		205		
ECTS							
8+1	8		1				
Teaching strategy		<p>The teaching includes oral and practical activities. The teaching activities will be held in classrooms equipped with multimedia tools through the projection for power point presentations. Innovative and interactive teachings will be held through online search in specific parasitology websites.</p> <p>Practical activities will be hold in didactic laboratories equipped with specific instruments such as optical microscopies (laboratory n ° 10 and n ° 11). Students will be divided into groups of a maximum of 10 people each. They will be followed by the teacher in charge assisted by the researchers and the technicians of the section. Each student will play individually the practical activities consisting in the identification of fungi and parasitic organisms by the macro- and microscopic examinations. Furthermore, the student will learn how to collect biological specimens and how to store them. The students will join field activities (i.e., bovine livestock farm).</p> <p>In the event of a health emergency, the course will be held in "technology enhanced" mode. Oral lessons will be delivered through the Microsoft Teams Platform, using Power Point presentations. The practical lessons will be delivered by using Video focused on the identification of organisms on the techniques useful to isolate etiological agents.</p>					
Expected learning outcomes		<p>The goals of this teaching activities are:</p> <p>1) the acquisition of general concepts and theoretical bases relating to taxonomy, morphology, biological cycle of the main parasites and fungal microorganisms causing diseases in pets, livestock and wild animals as well as their epidemiology, clinical manifestations of the infections, diagnosis and prophylaxis.</p> <p>2) the acquisition of technical and professional skills useful for assessing the impact of fungi and parasites on animal welfare trough a correct diagnosis, a prompt treatment as well as prophylaxis plans for the correct management of pets, livestock and synanthropic animals.</p>					

<p>Knowledge and understanding on:</p>	<p>Students will be able to identify fungi and parasites, causing animal infections and those of zoonotic concern, at genus and species level. They will know the:</p> <ul style="list-style-type: none"> a) biological aspects of interaction between microorganisms and host (commensalism, saprophytism, and parasitism); b) pathogenetic mechanisms of parasites and fungi in the host and the main clinical aspects of the studied diseases; c) the methods and tests for performing a correct diagnosis and the good laboratory practices. Finally, they have to be able to recognize parasites and fungi causing zoonosis by using a "One Health" approach as well as studying the close relationship between human and animal health and the ecosystems.
<p>Applying knowledge and understanding on:</p>	<p>The course promotes the acquisition of skills useful for the identification at genus and/or species level of parasites and fungi of medical-veterinary concern (i.e., pets, livestock and synanthropic animals) as well as the development and management of prophylaxis plans in the livestock with particular regards to the improvement of primary productions.</p>
<p>Soft skills</p>	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ This teaching will help the student to achieve a growing degree of autonomy in judging the activities related to fungal and parasitic diseases by: (i) identifying the sources of a parasitic and fungal infections and their etiological agents; (ii) carrying out prophylaxis and control plans for reducing the risks of infection; (iii) organizing knowledge independently for making simple interdisciplinary connections with related subjects; • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Students must be able to: (i) fully frame their work in wider contexts and motivate the choices made in an understandable and convincing way; (ii) transfer their knowledge adapting the communication method to the needs of the interlocutor; (iii) cooperate effectively in the activities of homogeneous and heterogeneous working groups; (iv) to easily start working and social relationships. These objectives will be pursued and constantly verified during the teaching activity, favoring the active participation of students during oral and practical activities. Students divided in working groups will collaborate in presenting specific topic (i.e., case report, epidemiological studies) through power point presentations. Students will be encouraged to communicate and improve their skills during the lessons and lab activities provided by the course. ○ <i>Capacities to continue learning</i> <ul style="list-style-type: none"> • At the end of the course the student must be able to broaden their knowledge and update themselves by independently drawing on texts, scientific articles and databases.
<p>Assessment and feedback Methods of assessment</p>	<p>The assessment of knowledge takes place through an oral exam on program topics. The student will have to know the morphological and biological aspects of parasites and fungi and the diseases they caused and describe how to prevent and control them. The students have to use the appropriate terminology and to be able to critically discuss the contents of</p>

	the subject. The final grade of the exam will be obtained by the average of the marks of the parts of Parasitology, Parasitic Diseases and Mycology
Evaluation criteria	<ul style="list-style-type: none"> • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ The student must demonstrate that she /he has acquired an autonomy of judgment in recognizing fungi and parasites. In addition, during the interview, the examiner will verify that the student has acquired an appropriate scientific language. • <i>Autonomy of judgment</i> <ul style="list-style-type: none"> ○ The student must demonstrate that she /he has acquired an autonomy of judgment in describing the fungal and parasitic disease, adequate diagnostic procedures useful to confirm the suspicion of infection and the measures useful for their control. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ During the oral exam, the scientific terminology used by the student and the presentation of the program contents; will be evaluated. ○ Students must be able to: (i) fully frame their work in wider contexts and motivate the choices made in an understandable and convincing way; (ii) transfer their knowledge adapting the communication method to the needs of the interlocutor; (iii) cooperate effectively in the activities of homogeneous and heterogeneous working groups; (iv) easily start working and social relationships. • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ During the oral exam, the examiner will assess whether the learning of knowledge has been sufficiently thorough and guided by a critical spirit.
Criteria for assessment and attribution of the final mark	The final grade of the exam will be obtained by the average of the marks of the modules of Parasitology, Parasitic Diseases and Mycology. The maximum score (30/30) will be assigned in cases where all the evaluation parameters outlined according to the so-called Dublin Descriptors are fully satisfactory (see above).
Additional information	