

ACADEMIC YEAR 2023/2024

General information	
Integrated course	BIOLOGY AND VETERINARY HISTOLOGY
Integrated academic modules	Applied Botany Zoology Histology and Embryology
Degree course	Veterinary Medicine
Academic year	I
ECTS	10 (lectures:9 ECTS; practical activity: 1 ECTS)
SSD	BIO/01 BIO/05 VET/01
Language	Italian
Academic calendar (starting and ending date)	II 7 week term
Attendance	Mandatory

Professor	E-mail	Telephone
Antonella Bottalico	antonella.bottalico@uniba.it	+39 0805442163
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Salvatore Desantis	salvatore.desantis@uniba.it	+39 080 5443801

Department and address	Campus of Veterinary Medicine, S.P. per Casamassima km 3, Valenzano (Ba), Italy
Virtual room	Teams platform
Tutoring (time and day)	Prof. Antonella Bottalico: Tuesdays 9:00-11:00 am and Wednesdays 9:00-11:00 am and 3:00-4:00 pm by appointment (phone or e-mail) Prof. Maria Mercurio: Monday 11:30-13:30 am and 3:00-4:00 pm on Teams, exclusively by appointment via email Prof. Salvatore Desantis: Monday -Thursday- Friday; 15:30-17:30 on Teams or in presence by appointment (phone or e-mail)

Syllabus	
Learning Objectives	The educational objectives of the integrated course "Biology and Veterinary Histology" is to provide the student with knowledge concerning the fundamental principles of plant and animal biology, including the structure of the eukaryotic cell and the functions of cell organelles; the organization and functions of tissues; the basic mechanisms of embryonic development; the formation, structure, and function of the embryonic annexa of mammals of veterinary interest. The student at the end of the course must have acquired the concepts necessary for better learning of morphological and clinical disciplines for practicing the medical veterinary profession in all relevant sectors.
Course prerequisites	There are no specific prerequisites other than those required for access to the degree course. Basic knowledge of animal and plant biology, zoology, and botany acquired at secondary level studies will facilitate the understanding of many covered topics.
Contents of the teaching	The course refers to Basic Subjects



<p>module: Applied Botany</p> <p>Teacher: Antonella BOTTALICO</p> <p>Lectures ECTS: 2</p> <p>Hours: 16</p>	<ul style="list-style-type: none"> • Introduction: the Plant Kingdom and the Archaeplastida; the endosymbiotic theory; the concept of plant organism; ➤ Cytology: the plant cell; plastids; cell wall; vacuole; ➤ Morphological and anatomical structure: primary and secondary meristematic and adult tissues; general organization, functions and specializations of the main plant organs; ➤ Reproduction and development: Spermatophytes; life cycle of Angiosperms; vegetative reproduction; sexual reproduction: the flower, pollination and fertilization, development of the fruit and dissemination; the seed: morphology and anatomy of the seed in Monocotyledons and Dicotyledons; hypogeal and epigeal germination; ➤ Plants of veterinary importance.
<p>Contents of the teaching module: Zoology</p> <p>Teacher: Maria MERCURIO</p> <p>Lectures ECTS: 4</p> <p>Hours: 32</p>	<p>The course refers to Basic Subjects</p> <ul style="list-style-type: none"> • Introduction Characteristics of living organisms. Division into Kingdoms. Definition of animal. Hierarchical organization of animal complexity. • Fundamental principles of animal life: The animal cell. Mitosis and meiosis. • Reproduction and development: <ul style="list-style-type: none"> ➤ Asexual and sexual reproduction. Hermaphroditism and gonochorism, sex determination. Amphigony and parthenogenesis. ➤ General features of embryonic development. ➤ Levels of animal organization: protostomes and deuterostomes, diblastic and triblastic, symmetry, metamery and body cavity. • Fundamentals of comparative morphology and physiology The integument. Skeletal systems. The movement. Breathing, circulation. Nutrition and digestion. Nervous system and sense organs. • Animal diversity <ul style="list-style-type: none"> ➤ Definition of biological diversity: genetic diversity, diversity at the species level, diversity at the community/ecosystem level. ➤ The value and function of biodiversity. Threats to animal diversity. • Taxonomy and structural plans of animals Nomenclature and animal classification. The animal architecture and bauplan. • Overview of the main animal phyla <ul style="list-style-type: none"> ➤ Protozoa. ➤ Generality, characteristics and phylogeny of the main animal phyla: Poriferans, Cnidarians, Mollusks (Gastropods, Bivalves and Cephalopods), Annelids, Arthropods (Chelicerates, Crustaceans, Myriapods, Hexapods), Echinoderms, Chordates (Urochordates, Cephalochordates and Vertebrates: Chondrichthyes, Osteichthyes, Amphibians, Reptiles, Birds, Mammals).
<p>Contents of the teaching module: HISTOLOGY AND EMBRYOLOGY</p>	<p>The course refers to Basic Sciences</p> <ul style="list-style-type: none"> • Histology. <ul style="list-style-type: none"> ➤ Structure and organization of the eukaryotic cell: cell membrane, cytosol,

<p>Teacher: Salvatore Desantis</p> <p>Lectures ECTS:3</p> <p>Hours: 30</p>	<p>cytoplasmic membrane system (endoplasmic reticulum, Golgi apparatus, lysosomes, vesicles), mitochondria, peroxisomes, cytoskeleton, centriole, vibratile cilia, flagellum; exocytosis, endocytosis, nucleus (nuclear envelope, chromatin, chromosomes, nucleolus).</p> <ul style="list-style-type: none"> ➤ Cell cycle. Cell differentiation and histogenesis. ➤ Epithelial tissue: simple epithelium (squamous, cuboidal, columnar, pseudostratified); stratified epithelium (squamous keratinized and non-keratinized, cuboidal, columnar, urothelium). Glands: exocrine and endocrine glands. ➤ Connective tissue: ground substance (glycosaminoglycans, proteoglycans, glycoproteins), fibers (collagen, reticular, elastic); cell types; basement membrane. Types of connective tissue: loose (areolar), dense, reticular, elastic, mucoid, pigmented, and adipose tissues. ➤ Cartilage: cells of cartilage; hyaline cartilage, elastic cartilage, fibrocartilage. ➤ Bone tissue: cells of bone; nonlamellar (primary), compact and cancellous bone tissue. ➤ Blood: plasma, erythrocytes, leucocytes (neutrophils, eosinophils, basophils, lymphocytes, monocytes), platelets. ➤ Muscle tissue: striated muscle (skeletal and cardiac muscle), smooth muscle. ➤ Nerve tissue: neurons, glial cells, myelin sheath, nerve fiber, synapses, peripheral nerve. <ul style="list-style-type: none"> • Embryology. <ul style="list-style-type: none"> ➤ Gametes. ➤ Fertilization, cleavage, blastocyst. ➤ Gastrulation: formation of ectoderm, mesoderm, endoderm and their derivatives; neurulation. ➤ Implantation of the blastocyst. ➤ Fetal membranes: amnion, chorion, yolk sac, allantois, umbilical cord. ➤ Placentation. Types of the placenta.
<p>Practical activities and exercises</p> <p>ECTS: 1 Hours: 15</p>	<p>P</p> <ul style="list-style-type: none"> • Techniques for cell and tissue investigation at light microscopy: collection, fixation, dehydration, embedding, and microtomy. • Light microscope: components and use. Recognition of cytological structures in histological sections stained with hematoxylin-eosin and with trichrome stainings. • Identification at light microscope of tissues and their structures in histological slide stained with haematoxylin-eosin, trichrome and the most common histochemical methods. • Observation at light microscope of histological sections of embryos at different stages of development. • Macroscopic analysis of fetuses and placentas of domestic mammals.
<p>Organization of practical activities</p>	<p>The practical activities are organized in the afternoon hours during the teaching bimester according to the schedule given in the class diary.</p> <p>Students will be divided into groups and the activities will be replicated for each group. The number of groups and the number of students per group will depend on the type of practical activity and the capacity of the practice room.</p>
<p>Biosecurity standards for the practical activities</p>	<p>Access to laboratories is allowed only to students equipped with protective clothing (gowns and disposable latex gloves), who have reviewed the biosafety manual and signed the risk exposure consent form.</p>

Personal study books and bibliography	
Books and bibliography	<p>Applied Botany Raven, Johnson, Mason, Losos, Singer. Struttura e funzione nelle piante (Structure and function of plants). ISBN: 978-88-299-2211-6 (ed. Piccin).</p> <p>Zoology at the student's choice: De Bernardi et al. (2012). Zoologia. Parte Generale. (Idelson-Gnocchi Ed.) Candia et al. (2016). Zoologia. Parte Sistemica. (Idelson-Gnocchi Ed.) OR Hickman et al. (2020). Fondamenti di zoologia. (McGraw-Hill Ed.) Hickman et al. (2020). Diversità animale. (McGraw-Hill Ed.)</p> <p>Histology and Embryology: Dalle Donne I: Citologia e Istologia. EdiSES Napoli, 2019. Junqueira: Istologia. Ed. Piccin, Padova, 2020. Monesi V: Istologia. 7a Edizione- Ed. Piccin, Padova, 2018. Bacha WJ, Wood LM: Atlante a colori di Istologia Veterinaria. Antonio Delfino Editore, 2003. Pelagalli, Castaldo, Lucini, Patruno, Scocco: Embriologia. Morfogenesi e anomalie dello sviluppo. III Edizione. Idelson-Gnocchi, Napoli, 2009.</p>
Additional materials	Additional teaching materials are provided by professors during the course, and available on the teaching TEAMS platform.

Work schedule			
Hours			
Total	Lectures	Hands-on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
250	78	15	147
CFU/ETCS			
10	9	1	NP

Teaching strategy	The main teaching methods adopted in the integrated course consist in face-to-face classroom lectures (Lectures) and self-assessment tests through the use of educational materials that the teachers provide both digitally (on the Teams platform) and practically during the laboratory activities of the Histology and Embryology module.
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Expected learning outcomes	
Knowledge and understanding on:	<ul style="list-style-type: none"> • Skills in the logical approach to scientific reasoning (DOC 2.1). • Research methods, contribution of basic and applied research to veterinary science (DOC 2.2). • The principles of effective interpersonal interaction, including communication, management and team working (DOC 2.11).

Applied knowledge and understanding on:	<ul style="list-style-type: none"> • Be able to critically review and evaluate literature and presentations (DOC 1.8) • Take part in peer group self-review and review processes to improve performance (DOC 1.14).
Soft skills	<p>Autonomy of judgment</p> <ul style="list-style-type: none"> • Be able, with full autonomy, to indicate the most appropriate approach for the study and functions of the different structures of plant and animal organisms, demonstrating competence in logical approaches to scientific reasoning (DOC 2.1). <p>Communication skills</p> <ul style="list-style-type: none"> • Be able to communicate, using correct scientific terminology (DOC 1.4) • Work effectively in groups, using appropriate communication and interaction strategies (DOC 1.6). <p>Ability to learn independently</p> <ul style="list-style-type: none"> • Be able to critically review and evaluate literature and presentations (DOC 1.8) • Ability to independently learn and investigate topics of professional interest while maintaining lifelong learning (DOC 1.13).
Summary of the acquired knowledge and skills (Day One Competence) as provided by the EAEVE	<p>Competences:</p> <p>1.4 1.6 1.8 1.13 1.14 2.1 2.2 2.11</p>

Assessment and feedback	
Methods of assessment	<p>The exam of the integrated course of "Biology and Veterinary Histology" allows the acquisition of 10 ECTS.</p> <p>The exam consists of the oral examination of the modules "Applied Botany" and "Zoology", and "Histology and Embryology". The examination of the modules can be taken in the same session or different sessions. The ECTS are considered acquired after passing the three parts and recording the minutes on the ESSE3 portal.</p>
Evaluation criteria	<ul style="list-style-type: none"> • <i>Knowledge and understanding:</i> <ul style="list-style-type: none"> ○ The student must demonstrate organic knowledge of topics of the course with particular regard to cytological, histological, morphological/functional, ecological and environmental aspects as well as the basic principles of embryology of the major mammals of veterinary interest; ○ The student must apply the acquired theoretical knowledge for the recognition, classification, and description of the animal phyla also by means of the comparative morphological analysis of the representative models. <p>Score from 1 to 8</p> • <i>Applying knowledge and understanding:</i> <p>The student must demonstrate good ability to apply acquired knowledge to the recognition of the plants of veterinary interest, of the plant and animal histological</p>



	<p>structures, and the main animal taxa studied relating them to ecological and environmental aspects.</p> <p>Score from 1 to 8</p> <ul style="list-style-type: none"> • <i>Autonomy of judgment:</i> <ul style="list-style-type: none"> ○ The student must demonstrate ability to identify the best approach to the recognition, individuation and description of the proposed structures and themes. <p>Score from 1 to 8</p> <ul style="list-style-type: none"> • <i>Communication skills:</i> <ul style="list-style-type: none"> ○ The student must demonstrate good expository skills in the topics studied and be able to use technical and scientific terminology appropriately. <p>Score from 1 to 3</p> <ul style="list-style-type: none"> • <i>Ability to learn:</i> <ul style="list-style-type: none"> ○ The student must demonstrate the ability to independently rework the knowledge acquired and be able to access scientific literature and databases for continuous updating. <p>Score from 1 to 3</p>
<p>Criteria for assessment and attribution of the final mark</p>	<p>The outcomes of the “Applied Botany” and, “Zoology”, and “Histology and Embryology” tests will contribute to the final grade of the Biology and Veterinary Histology exam.</p> <p>The final grade is the result of the collegial judgment related to the modules in which the student must demonstrate that she/he has acquired a critical sense of the topics studied. The exam, expressed in thirtieths, will be considered passed with a grade equal to or greater than 18. The mark will take into consideration not only the accuracy of the answer, but also the ability to communicate, clarity of exposition, disciplinary competence, and the level of in-depth study. To students with a strongly positive evaluation in the three modules, the Examination Commission may decide, unanimously, to award honors at the final mark of Biology and Veterinary Histology (30 cum laude).</p>
<p>Additional information</p>	