

General information	
Academic subject	<i>Histology and Embryology</i>
Degree course	Veterinary Medicine
Academic Year	2021/2022
European Credit Transfer and Accumulation System (ECTS)	4
Language	Italian
Academic calendar (starting and ending date)	III two months
Attendance	Mandatory

Professor/ Lecturer	
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Tutoring (time and day)	15:30 - 17:30 Monday-Wednesday- Friday. Other days by appointment

Syllabus	
Learning Objectives	The course is aimed at providing knowledge concerning: 1) the structural organization of the eukaryotic cell and the function of cytoplasmic organelles; 2) the structural organization of mammalian tissues; 3) the sequential stages of the early development of mammalian embryos as well as the development, the structure and the function of foetal membranes in domestic animals.
Course prerequisites	Students must have basic knowledge of cell biology
Contents	Histology and its methods of study. Light, confocal and electron microscopes. Eukaryotic cell: plasma membrane; cytosol; endomembrane system (endoplasmic reticulum, Golgi apparatus, lysosomes, vesicles); mitochondria, peroxisomes; cytoskeleton; centrioles; cilia; flagellum; exocytosis; endocytosis; nucleus (nuclear envelope, chromatin, chromosomes, nucleolus); cell cycle. 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 tissues: ground substance, fibers (collagen, reticular, elastic); cell types; basement membrane. Types of connective tissue: loose areolar, dense, reticular, elastic, mucoid, pigmented, adipose tissues. Cartilage: hyaline, elastic, fibrous. Bone: cancellous and compact. Blood: plasma and blood cells (erythrocytes, platelets, leucocytes: neutrophils, eosinophils, basophils, lymphocytes, monocytes). Muscle tissue: striated skeletal muscle; cardiac muscle; smooth muscle. Nerve tissue: neurons, glial cells, myelin sheath, nerve fibers, synapses. Embryology: gametes; fertilisation; cleavage; blastocyst; gastrulation; neuronal tube; ectoderm, mesoderm; endoderm; blastocyst implantation; foetal membranes (chorion, amnion, yolk sac, allantois). Placentation. Types of placenta.
Books and bibliography	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. Noden DM, De Lahunta A: Embriologia degli Animali Domestici. Edi. Ermes, Milano, 1991.		
Additional materials	Lecture notes and scientific papers.		
Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
100	30	25	45
ECTS			
4	3	1	
Teaching strategy			
	Frontal lessons and supervised practical lessons. Frontal lessons are supported by projection of images in powerpoint format. Supervised practical lessons consist in the preparation of tissue sections (slides), the observation and identification at light microscope of cell structures and tissue types in differently stained histological slides; identification of foetal membranes and the type of placenta in the conceptus of different domestic animals.		
Expected learning outcomes			
Knowledge and understanding von:	Students will acquire the knowledge of <ul style="list-style-type: none"> ○ the microscopic structures constituting the animal body (cells and tissues); ○ the basic stages of mammalian embryo development; ○ differentiation of embryonal and foetal adnexa in domestic animals. 		
Applying knowledge and understanding on:	Students will acquire the ability <ul style="list-style-type: none"> ○ to correlate the morpo-functional aspects of the cell structures ○ to identify the tissues and to correlate the morpo-functional of the tissue structures ○ recognize the early stages of embryo development ○ recognize the structure and the functions of the foetal membranes 		
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> Students will acquire the ability <ul style="list-style-type: none"> ○ to propose the suitable methods to analyze the structures and molecules constituting the tissues ○ to trace the functions of cell and histological structures starting from their structure • <i>Communicating knowledge and understanding</i> Students will acquire the ability <ul style="list-style-type: none"> ○ to exactly describe the topics covered in the course ○ to thoroughly describe the topics covered in the course ○ to understandably describe the topics covered in the course • <i>Capacities to continue learning</i> Students will acquire the ability <ul style="list-style-type: none"> ○ to understand and interpret scientific articles via critical reading in order to independently learn cytological and histological data on new scientific 		

	methodologies useful for furthering their education.
Assessment and feedback	
Methods of assessment	Students will take an oral exam which is preceded by the identification of a tissue with the light microscope. The students will be evaluated for the ability to recognize the structures present in a histological slide and to exhibit the knowledge of cytology, histology and embryology acquired during the course. Great importance will be given to the accuracy, completeness and quality of exposure when answering the asked questions.
Evaluation criteria	<ul style="list-style-type: none"> • <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ knowledge of cell structure and tissue organization ○ knowledge of the sequential stages of the early development of mammalian embryos as well as the development, the structure and the function of foetal membranes in domestic animals. • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ knowledge of the structure and function of cell components ○ identification of tissues and knowledge of the relationship between structure and function ○ recognition of the foetal membranes and evaluation of their function • <i>Autonomy of judgment</i> <ul style="list-style-type: none"> ○ suggest the appropriate methods for the analysis of molecules and structures constituting the tissues ○ description of the structures present in the light microscopic fields and in micrographs ○ indicate the function of the analyzed structures • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ exact description of the topics ○ full description of the topics ○ understanding of the described topics • <i>Communication skills</i> <ul style="list-style-type: none"> ○ easy understanding of the described topics • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ relationship between the morphology and the function of the studied structures ○ new devices for histological studies ○ new methods in histological analysis
Criteria for assessment and attribution of the final mark	The final mark is expressed out of 30. The student will be asked , in succession, three separate topics. The exam is passed if the mark is at least 18/30. Each topic has the same weight in the attribution of the final mark. A high mark will be given if the student demonstrates a great accuracy, completeness, quality of exposure and autonomy of judgment to the asked questions.
Additional information	The mark will be averaged with the mark obtained in the exam of Anatomy of domestic animal 1.

