Information about the subject

Degree: Bachelor of Science Degree in Veterinary Medicine

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 1261107 **Name:** Animal Cytology and Histology

Credits: 6,00 **ECTS Year:** 1 **Semester:** 2

Module: Module of Common Basic Training

Subject Matter: Animal Anatomy **Type:** Basic Formation

Field of knowledge: Health Sciences

Department: Animal Production and Public Health

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

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Module organization

Module of Common Basic Training

Subject Matter	ECTS	Subject	ECTS	Year/semester
Statistics	6,00	Biometrics and Statistics	6,00	1/1
Biology	6,00	Animal and Plant Biology	6,00	1/1
Biochemistry	6,00	Biochemistry	6,00	1/2
Animal Anatomy	18,00	Animal Anatomy I and Embryology	6,00	1/1
		Animal Anatomy II	6,00	1/2
		Animal Cytology and Histology	6,00	1/2
Animal Physiology	12,00	Animal Physiology I	6,00	2/1
		Animal Physiology II and Immunology	6,00	2/2
Genetics	6,00	Genetics	6,00	1/2
Animal Domestication	6,00	Animal Domestication (Ethnology, Ethology and Animal Welfare)	6,00	1/2
Biological Agents of Interest in Veterinary Medicine	12,00	Veterinary Microbiology	6,00	2/2
		Veterinary Parasitology	6,00	2/1
Veterinary Medicine and Society	6,00	Veterinary Regulations and Legislation, Social Morality and Professional Deontology	6,00	5/1

Physics and Chemistry	6,00	Physico-chemical fundamentals of veterinary medicine	6,00	1/1

Recommended knowledge

Basic knowledge of biology. No pre-requisites established.

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

R1	The student searches bibliographic information from different sources and knows how to analyse it with a critical and constructive spirit.
R2	The student knows and uses the basic histological nomenclature correctly.
R3	The student knows the parts of the optical microscope and uses it correctly.
R4	The student knows the basic laboratory techniques used in histological studies.
R5	The student distinguishes different tissues at the microscopic level.
R6	The student relates the structures observed at a microscopic level to those observed macroscopically.
R7	The student can produce documents about histology and work as a team.

Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB1	Students must show that they have and understand knowledge in a field of study that is based on general secondary education on a level that, although supported by advanced text books, includes also some aspects that involve knowledge belonging to the vanguard of their field of study.				x

SPECIFIC		Weighting			
		1	2	3	4
E4	Understanding and applying principles and bases of the eukaryotic cell structure and organization in tissues and organs.				x
E5	Understanding and applying principles and bases of morphology, topography and structure of organs and systems.				x
E6	Understanding and applying principles and bases of ontogenetic development, congenital anomalies and embryology applications.				x

TRANSVERSAL		Weighting			
		1	2	3	4
T1	Capacity of analysis, synthesis, implementation of knowledge for problem-solving and decision-making.			x	
T4	Mastering fluency in oral and written mother tongue communication, listening and responding effectively using a language appropriate to audience and context.				x
T6	Using information technology to communicate, share, search for, collect, analyze and manage information, especially related to the veterinarian practice.				x

T8	Efficient and effective work, both independently and as a member of a multidisciplinary team or unit, showing respect, appreciation and sensitivity to the work of others.			x
T10	Ability to learn, to research, and to be aware of the need to keep knowledge updated, and attending training programs.		x	

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R2, R3, R4, R5, R6	50,00%	Written assessment of acquired knowledge and skills. The test may consist of a series of open-ended questions or multiple-choice questions about the theoretical contents of the module and/or practical exercises (problem-solving).
R1, R2, R3, R4, R5, R6, R7	20,00%	Evaluation of the use of the practical lessons in the classroom, of problems or computer science, seminars and tutorials, by means of participation, computer-supported problem solving and the elaboration of the corresponding reports.
R2, R3, R4, R5	30,00%	Evaluation of the practical laboratory work, which must demonstrate the competences acquired by the student and his or her ability to use them to solve the different situations and problems that arise in a laboratory; this assessment may consist of one of the following methods, or a combination of several of them: an individual written test, the individual or group performance of a laboratory experience, the delivery of an individual or group report on the work carried out in the laboratory.

Observations

*It is essential to obtain a minimum score of 5 on the test in order to pass the course. If this score is not obtained, the qualification for the remaining items will be saved for the next two calls of the following course. The written test represents 50% of the final grade. For this purpose, an exam will be held on the theoretical knowledge.
Attendance at practices is considered compulsory. During the practical sessions the teacher will keep track of the attendance and attitude of each student. Factors such as attention, degree of participation, interest shown and the report made during the practice will be taken into account, which will represent 20% of the final grade of the course. Unjustified absence from all the practices of the subject will suppose a discount of 50% of the score of the practical exam.
**It is essential to obtain a minimum score of 6 in the test in order to pass the course. If this score is not obtained, the qualification for the remaining items will be saved for the next two calls of the following course. The practical evaluation will include any aspect related to the practices carried out

during the academic year and will consist of an exam where the student must identify histological preparations. The evaluation of the practical activities constitutes 30% of the final grade.
Overall evaluation:
The results of the different evaluation activities are weighted for the final grade. In order to pass the course it will be necessary to obtain, at least, a grade equal to or higher than 5 points out of 10 in the section marked with an asterisk (*) and 6 points out of 10 in the section marked with two asterisks (**). If in these sections the minimum qualification is not obtained but other evaluation items have been passed, these passed qualifications will be kept during the two following course announcements, as the required competences have been passed.
Those students who, for a justified reason (see article 10 of the current regulations https://www.ucv.es/documentos/normativa/documento11.html), cannot attend the assessment of the subject on the official examination date, may undergo the final assessment of the subject by means of an oral or written examination, at the teacher's discretion.
In all written assessments in the subject, spelling will be taken into account, so that for each spelling mistake (including marks), 0.1 points will be deducted from the final mark, up to a maximum of 2 points.

MENTION OF DISTINCTION:
According to Article 22 of the Regulations governing the Evaluation and Qualification of UCV Courses, the mention of "Distinction of Honor" may be awarded by the professor responsible for the course to students who have obtained, at least, the qualification of 9 over 10 (“Sobresaliente”). The number of "Distinction of Honor" mentions that may be awarded may not exceed five percent of the number of students included in the same official record, unless this number is lower than 20, in which case only one "Distinction of Honor" may be awarded.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

M1 On-site training activity aimed primarily at acquiring knowledge acquisition skills. It is characterised by the fact that students are spoken to. Also called master class or exposition, it refers to the oral presentation made by the teacher, (with the support of blackboard, a computer and a projector for the display of texts, graphs, etc.), in front of a group of students. They are expository, explanatory or demonstrative sessions of contents. The size of the group is determined by the limit or physical capacity of the classroom; therefore, it is a single group.

M2 On-site training activity aimed primarily at obtaining knowledge application and research skills. Knowledge is built through interaction and activities. The activity consists of supervised monographic sessions with shared participation (teachers, students, experts). The size of the group is variable, from one large group to various small groups, with a minimum of 6 students to ensure interaction. The evaluation will be based on follow-up records kept by the teacher. Participation and the development of the capacity to problematize should be taken into account.

M4 On-site training activity in groups that takes place in the classroom. It includes working with documents and formulating ideas without handling animals, organs, objects, products, or corpses (e.g., work with articles or documents, clinical case studies, diagnostic analyses, etc.). It would correspond to "Animal-free supervised practical work", type e1, from the European evaluation of EAEVE. The size of the group is variable, in a range of 10 to 20 students.

M5 On-site training activity in groups that takes place in the Computer Lab where the computer is used as support for learning. It includes work with computer models, specific software, Web queries, etc. It would correspond to "Animal-free supervised practical work", type e1, from the European evaluation of EAEVE. The size of the group is variable, in a range of 10 to 20 students.

M6 On-site training activity in groups carried out in the laboratory. It includes the sessions where the students develop laboratory experiments, make dissections or use the microscopes for the study of histological or histopathological samples actively and autonomously, under the supervision of the professor. It also includes work with healthy animals, objects, products, corpses (e.g., animal handling, bacteriological practices, physiology or biochemistry, meat inspection, etc.). It would correspond to the "Supervised practical non-clinical animal work" type e2 of the European evaluation of EAEVE. The size of the group is variable, in a range of 10 to 20 students.

M8 A set of on-site training activities carried out by the teacher to provide personalised attention to the student or in small groups with the aim of reviewing and discussing the materials and topics presented in classes, seminars, readings, carrying out projects, etc. The aim is to ensure a truly comprehensive education of the student rather than a mere transfer of information. It is, therefore, a personalized assistance relationship in which the tutor assists, facilitates and guides one or more students in the learning process.

M9 Set of processes that attempt to evaluate the learning outcomes of students expressed in terms of acquired knowledge, capacities, skills or abilities developed and manifested attitudes. It covers a wide range of activities that can be developed for students to demonstrate their training (e.g. written, oral and practical tests, projects or assignments). It also includes the Official Calls.

M10 Autonomous training activity, including activities and coursework, bibliographic searches. The results obtained from unsupervised group and teamwork will be evaluated, with particular attention paid at the time of evaluation to the acquisition of specific knowledge development skills through group work.

M11 Autonomous training activities related to personal study, or the preparation of individual course assignments. The individual preparation of readings, essays, problem solving, papers, reports, etc. will be evaluated through presentations or submissions during theoretical classes, practical classes, seminars and/or tutorials. The evaluation of the submitted papers will consider the structure of the paper, the quality of the documentation, originality, spelling and presentation.

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical lessons (TL) M1	R2, R3, R4, R5, R6	38,00	1,52
Computer Practice (CoP) M5	R1, R2, R3, R4, R5, R6, R7	8,00	0,32
Laboratory Practice (LP) M6	R2, R3, R4, R5, R6, R7	10,00	0,40
Tutorial M8	R1, R2, R3, R4, R5, R6, R7	2,00	0,08
Evaluation (Ev) M9	R1, R2, R3, R4, R5, R6, R7	2,00	0,08
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Individual work M11	R1, R2, R3, R4, R5, R6, R7	90,00	3,60
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
Introduction to veterinary histology. The cell.	Introduction to the course and to the basics of cytology.
Epithelial tissue.	Introduction. Coating epitheliums. Glandular epitheliums. Specializations of the membrane of epithelial cells.
Connective tissue. Adipose tissue.	Introduction. Extracellular matrix: amorphous fundamental substance and configured fundamental substance. Connective tissue cells. Types of connective tissue. Adipose tissue.
Lymphoid system.	Primary lymphoid organs. Secondary lymphoid organs. Mucosa-associated lymphoid tissue (MALT): tonsils and Peyer's patch.
Cartilaginous tissue. Bone tissue.	Functions. Macro and microscopic structure. Ossification.
Muscle tissue.	Types: Smooth muscle tissue, striated muscle tissue (skeletal and cardiac).
Nervous tissue.	Nervous tissue cells: neurons and neuroglia. Synapses. Central nervous system: brain, cerebellum and spinal cord. Peripheral nervous system. Meninges
Circulatory system.	Circulatory system.Blood vascular system: arteries, veins, capillaries and heart. Lymphatic system.
Blood.	Blood cells (erythrocytes, leukocytes, and platelets). Hematopoiesis.

Digestive system.	General information. General structure. Digestive tract, ruminants' pre-stomachs, stomach, intestine. Liver and bile ducts.
Respiratory system.	Nasal cavity. Trachea. Lung: bronchi, bronchioles and alveoli.
Urinary system.	Kidney. Renal structure: capsule, cortical, medullary. Nephrone. Collector tube system. Juxtaglomerular apparatus. Urinary tract: Renal pelvis. Ureters. Urinary bladder. Urethra.
Reproductive system.	Female: Ovary. Uterine tubes. Uterus. Vagina. Mammary gland. Male: testicle and epididymis. Penis.
Tegument	Skin: Epidermis, dermis, hypodermis. Hair. Skin glands: sebaceous and sweat glands.
Organs of the senses.	Eye: Fibrous tunic, vascular tunic, nervous tunic and accessory appendages.

Organization of the practical activities:

	Content	Place	Hours
PR1.	Histology issue processing.	Computer	2,00
PR2.	Coating and glandular epitheliums.	Computer	2,00
PR3.	Connective tissue. Bone and cartilaginous tissue.	Computer	2,00
PR4.	Muscle tissue. Nervous tissue.	Computer	2,00
PR5.	Circulatory system. Blood.	Laboratory	2,00
PR6.	Lymphoid organs. Respiratory system.	Laboratory	2,00
PR7.	Digestive system.	Laboratory	2,00
PR8.	Urinary system. Male and female genital system.	Laboratory	2,00
PR9.	Endocrine glands. Skin. Eye.	Laboratory	2,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
Introduction to veterinary histology. The cell.	2,00	4,00
Epithelial tissue.	3,00	6,00
Connective tissue. Adipose tissue.	2,00	4,00
Lymphoid system.	2,00	4,00
Cartilaginous tissue. Bone tissue.	2,00	4,00
Muscle tissue.	2,00	4,00
Nervous tissue.	2,00	4,00
Circulatory system.	2,00	4,00
Blood.	2,00	4,00
Digestive system.	3,00	6,00
Respiratory system.	2,00	4,00
Urinary system.	2,00	4,00
Reproductive system.	2,00	4,00
Tegument	1,00	2,00

Organs of the senses.	1,00	2,00

References

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H. Dieter Dellmann. 1993. **Histología veterinaria**. Acribia.
H. Dieter Dellmann. 2006. **Textbook of veterinary histology**. Blackwell.
L. C. Junqueira, José Carneiro.2015. **Histología básica: texto y atlas**. Masson.
Michael H. Ross, Wojciech Pawlina, Todd A. Barnash. 2012. **Atlas de Histología descriptiva.** Médica Panamericana.
Ricardo Paniagua. 2002. **Citología e histología vegetal y animal**. **Biología de las células y tejidos animales y vegetales.** McGraw-Hill/Interamericana.
William J. Bacha, jr., Linda M. Bacha. 2001. **Atlas color de histología veterinaria**. Inter-Médica.
http://cal.vet.upenn.edu/projects/histo/Index.htm
http://wzar.unizar.es/acad/histologia/paginas/Atlas_inicio.htm

Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

Situation 1: Teaching without limited capacity (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

Situation 2: Teaching with limited capacity (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

[X] Microsoft Teams

[X] Kaltura

Situation 3: Confinement due to a new State of Alarm.

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

[X] Microsoft Teams

[X] Kaltura

Explanation about the practical sessions:

The practices will be taught electronically using the Case Viewer and Microsoft Teams application, keeping both the content of the same as the duration in all cases.

2. System for Assessing the Acquisition of the competences and Assessment System

ONSITE WORK

Regarding the Assessment Tools:

[X] The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

[ ] The following changes will be made to adapt the subject's assessment to the online teaching.

Course guide		Adaptation	
Assessment tool	Allocated percentage	Description of the suggested changes	Platform to be used

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

Comments to the Assessment System: