Information about the subject

Degree: Bachelor of Science Degree in Veterinary Medicine

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 1260201 **Name:** Special pathological anatomy

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

Module: Module of Clinical Sciences and Animal Health

Subject Matter: Alterations in Structure and Function, and Fundamentals of Diagnosis **Type:**

Compulsory

Department: Animal Production and Public Health

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

Module organization

Module of Clinical Sciences and Animal Health

Subject Matter	ECTS	Subject	ECTS	Year/semester
Alterations in Structure and Function, and Fundamentals of Diagnosis	36,00	Clinical diagnostic techniques I (Clinical Propedeutics)	6,00	3/1
		Clinical Diagnostic Techniques II (Imaging Diagnosis)	6,00	3/1
		Histopathology and General Pathological Anatomy	6,00	2/1
		Physiopathology and general integrated Pathology I	6,00	2/1
		Physiopathology and general integrated Pathology II	6,00	2/2
		Special pathological anatomy	6,00	2/2
Pharmacology and Therapeutics	12,00	Pharmacology and Toxicology	6,00	3/1
		Pharmacotherapy, preventive medicine and veterinary hygiene	6,00	5/1
Clinical Sciences and Animal Health	60,00	Clinic and health in equines	6,00	3/2
		Clinic and health in water animals	6,00	5/1
		Clinic and health in wild and exotic animals	6,00	3/2

Clinical Sciences and Animal Health	Clinic and health on the farm I	6,00	4/1
	Clinic and health on the farm II	6,00	4/2
	Epidemiology	6,00	3/1
	Pet Clinic	6,00	3/2
	Reproduction and Obstetrics	6,00	3/1
	Veterinary Surgery I	6,00	3/2
	Veterinary Surgery II	6,00	4/1

Recommended knowledge

Prerequisites: Have attended to the subjects Animal Cytology and Histology and Histopathology and General Pathological Anatomy.

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 is able to differentiate organs with a pathology from those that are healthy or with post-mortem alterations.
R2	The student uses specific terminology to name the different lesions.
R3	The student knows the main lesions observed in the most relevant domestic species.
R4	The student is able to link the causal agent and the pathogenesis of a given disease with its consequences.
R5	The student knows the necropsy technique and the sampling procedure for histopathology.
R6	The student is able to recognize lesions both macroscopically and microscopically.
R7	The student is able to write an anatomopathological report.
R8	The student searches bibliographic information from different sources and knows how to analyse it with a critical and constructive spirit.
R9	The student is familiar with the physiopathology of the main vital systems.
R10	The student argues according to rational criteria based on his or her work.
R11	The student is able to solve problems related to the contents of the module.
R12	The student is able to differentiate cells, tissues or organs with a pathology from those that are healthy or with post-mortem alterations.
R13	The student is able to link the pathogenesis of a given disease with its consequences.
R14	Analyzing, synthesizing, solving problems and making decisions related to the subject.
R15	Collecting, preserving and sending different types of biological samples to the laboratory.

R16 The student is able to work effectively independently or in a team, maintaining respect for peers.

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
CB2	Capacity to apply knowledge to work or occupation in a professional way and have the competences that are proved by preparing and arguing topics and problem-solving in their specific field of study.			x	
CB3	Capacity to gather and interpret relevant data usually within their specific field of study and capacity to make judgments that include reflection on relevant social, scientific or ethical issues.			x	
CB4	Capacity to communicate information, ideas, problems and solutions at specialist and non-specialist levels.			x	

GENERAL		Weighting			
		1	2	3	4
CG2	Understanding and applying prevention, diagnosis and individual or collective treatment , and control of animal diseases, individually or in groups, with special attention to zoonoses.				x
CG6	Developing professional practice, acquiring skills related to teamwork, with an efficient use of resources and quality management.				x
CG7	Identifying emerging risks in all areas of the veterinary profession.		x		

SPECIFIC		Weighting			
		1	2	3	4
E22	Knowing and applying principles and bases of nosology.		x		
E23	Knowing and applying principles and bases of the description and pathogenesis of general alterations of the structure and function of cells, tissues, organs and systems.				x

E24	Knowing and applying methods and procedures of clinical examination, additional diagnostic techniques and their interpretation.				x
E25	Knowing and applying imaging diagnostic and radiation biology.	x			
E26	Knowing and applying necropsy.				x
E27	Knowing and applying recognition and diagnosis of different types of injuries and their association with pathological processes.				x
E29	Knowing and applying diagnosis.				x

TRANSVERSAL		Weighting			
		1	2	3	4
T1	Capacity of analysis, synthesis, implementation of knowledge for problem-solving and decision-making.				x
T2	Understanding and applying the scientific method to professional practice including evidence-based medicine.				x
T3	Basic knowledge of the veterinary profession: legal, economic, administrative, planning and time management issues and the veterinarians' society together with the importance of monitoring quality, standardization and protocols of veterinary practice.			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
R1, R2, R3, R4, R6, R9, R12, R13	40,00%	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).
R5, R7, R8, R10, R11, R14, R16	10,00%	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.
R1, R2, R3, R4, R5, R6, R7, R9, R10, R11, R12, R13, R14, R16	15,00%	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.
R1, R2, R3, R4, R5, R6, R7, R9, R10, R11, R12, R13, R14, R16	15,00%	Evaluation of practical work in a clinic through which the student must demonstrate the competences acquired and the ability to use them to solve the different situations and problems that arise in a clinic; this assessment may involve one of the following methods, or a combination of several of them: a written individual test, the individual or group performance of a clinical experience, the delivery of an individual or group report on the work carried out in the laboratory.

R1, R2, R3, R4, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16	20,00%	Evaluation of group work through a system of continuous assessment throughout the course based on the delivery of assignments the objectives and content of which will be proposed by the teacher.
	0,00%	Evaluation of activities in which the student must do some research individually and structure information related to each of the topics through a system of continuous assessment throughout the course based on the delivery of papers, the objectives and contents of which will be proposed by the teacher.

Observations

It is essential to obtain a minimum score of 5 on the test to pass the course. In case of not obtaining said score, the qualification of the rest of the items will be saved during the two calls of the following course. The written test represents 40% of the final grade. For this, an exam will be developed on theoretical knowledge. The theoretical exam will consist of multiple choice questions (each question with 4 options, of which only one is correct). The proportion of 3 incorrect questions will subtract a correct one. Attendance at practices is considered compulsory. During the practical sessions the Teacher will control the attendance and the attitude of each student. Factors such as attention, degree of participation and interest shown during practice will be taken into account, which will represent 10% of the final grade for the course. ** It is essential to obtain a minimum score of 6 on the test to pass the course. In case of not obtaining said score, the qualification of the rest of the items will be saved during the 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 on projected images where the student must demonstrate the skills acquired in the subject. The evaluation of practical activities constitutes 15% of the final grade. The evaluation of group work represents 15% of the final grade. The students, divided into groups of 2 to 5 people, will present a pathology report at the end of each autopsy practice. The Professor will value the presentation of the report as well as the involvement of all group members. The evaluation of the individual work represents 20% of the final grade. The student must present a detailed work on a specific pathology agreed with the Professor. Overall evaluation: For the final grade, the results of the different evaluation activities are weighted. To pass the course it will be necessary to obtain, as a minimum, a grade equal to or greater 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 the minimum qualification is not obtained in these sections but other evaluation items have been approved, these approved qualifications will be kept during the two calls of the following course, for having passed the required competences.

Those students who, for just cause (see article 10 of the current regulations https://www.ucv.es/documentos/normativa/documento11.html), cannot attend the evaluation of the subject on the official date of exams , they can undergo the final evaluation of the subject through an

oral or written exam according to the teacher's criteria. In all the written evaluations carried out in the subject, spelling will be taken into account, so that for each misspelling (including accents) 0.1 points will be subtracted from the final grade up to a maximum of 2 points. Award Criteria for Honor Enrollment: At the discretion of the teacher, an honor enrollment can be awarded for every 20 students (not for a fraction of 20; except for the first 20 students) -Only honor enrollment can only be granted on the first call of the first year of enrollment of the student in the subject. -The teacher may grant honors to any of the students who have obtained an outstanding grade in the subject. Exam review: after the publication of the notes, the student will have the exam review times published on the intranet to review their exam. Unless specifically indicated otherwise by the teaching staff, exams will not be shown outside these hours.

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.

M7 On-site training activity that is defined as the clinical practical work developed in the Veterinary Clinical Hospital or clinical centres ascribed to the University, as well as itinerant clinical practices, mainly with ruminants, equids, pigs, birds and aquatic animals. Also included are necropsies, surgical workshops and training in clinical examination techniques or diagnosis with healthy patients. In these practical sessions the student will always work with animals, which can be healthy (e.g. propaedeutic or obstetrics) or clinical cases (individual or collective), including a protocol or work scheme, being supervised by a teacher and assuming the provision of a service. This type of training corresponds to type e3 of the EAEVE European evaluation called "Clinical Training" (strickly hands-on)". The size of the group will be 5 students or fewer.

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	R1, R2, R3, R4, R6, R9, R11, R13	60,00	2,40
Laboratory Practice (LP) M6	R1, R2, R4, R5, R6, R7, R8, R9, R10, R11, R13, R14, R16	5,00	0,20
Clinical Practice (CP) M7	R1, R2, R3, R4, R13	25,00	1,00
TOTAL		**90,00**	**3,60**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Group work M10	R1, R2, R6, R7, R8, R10, R13, R14, R16	20,00	0,80
Individual work M11	R2, R8, R9, R10, R13, R14	40,00	1,60
TOTAL		**60,00**	**2,40**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
INTRODUCCTION TO VETERINARY PATHOLOGY	Basic concepts of Anatomic Pathology. ¿What does a Pathologist? Importance and applications in Veterinary Medicine.
UNIT 1.- CARDIOVASCULAR SYSTEM	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. HEART.** Congenital cardiac malformations. Cardiac hypertrophy and cardiomyopathies. Traumatic reticulo-pericarditis. Endocarditis and valvular endocardiosis. Cardiotoxicity. Cardiac neoplasms. **BLOOD VESSELS.** Arterial hypertrophy and hyperplasia. Arteriosclerosis and atherosclerosis. Aneurysms and vascular ruptures. Vasculitis: arteritis and phlebitis.
UNIT 2.- RESPIRATORY SYSTEM	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. NASAL CAVITY, LARYNX AND TRACHEA.** Rhinitis. Sinusitis and guturocystitis. Intranasal neoplasms. Equine laryngeal hemiplegia. Laryngotracheitis. **LUNG AND PLEURA.** Pulmonary atelectasis and emphysema. Hemodynamic pathologies of the lung. Pneumonia and pleuritis. Pneumothorax. Lung neoplasms.
UNIT 3.- URINARY SYSTEM	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. KIDNEY.** Secondary lesions to kidney disease. Polycystic kidney disease. Acute tubular necrosis. Nephritis. Nephrotoxins. Renal neoplasms. **URINARY TRACT.** Hydronephrosis. Pyelonephritis. Cystitis. Urolithiasis. Urothelial cell carcinoma.

UD 4.- REPRODUCTIVE SYSTEM	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. UTERUS, OVARY AND FETUS.** Cystic endometrial hyperplasia. Pyometra and placentitis. Adenomyosis and endometriosis. Reproductive tract and ovarian neoplasms. Fetal death. Fetal malformations. **MAMMARY GLAND.** Fibroadenomatous mammary hyperplasia. Basic concepts of mammary neoplasms. Histological phenotype of mammary neoplasms. Classification and grading of breast neoplasms. **TESTICLE AND PROSTATE.** Seminoma. Sertoli cell tumor. Leydig cell tumor. Benign prostatic hyperplasia. Testicular teratoma. Granular cell testicular tumor.
UNIT 5.- DIGESTIVE SYSTEM AND PERITONEUM	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. ORAL CAVITY, PHARYNX AND ESOPHAGUS:** Stomatitis. Enamel hypoplasia and Palatoschisis. Neoplasms of the oral cavity. Pharyngitis and esophagitis. Esophageal obstruction and Megaesophagus. **FORESTOMACH AND STOMACH.** Reticulo-ruminal parakeratosis. Tympanism and Ruminal acidosis. Gastric Dilatation-Volvulus. Abomasitis and gastritis. Gastric neoplasms. **INTESTINE AND PERITONEUM.** Volvulus, strangulation and Intussusception. Intestinal obstruction and stenosis. Enteritis. Feline Infectious Peritonitis (FIP). Intestinal and peritoneal neoplasms.
UNIT 6.- LIVER	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. LIVER:** Diseases associated to Lipid storage. Patterns of hepatocellular necrosis. Extrahepatic portosystemic shunt. Hepatitis. Liver toxicity. Hepatic cirrhosis. Hepatic neoplasms. **BILIARY TRACT**: Mucinous cystic hyperplasia. Biliary mucocele. Cholangitis and cholecystitis. Cholelithiasis
UNIT 7.- PANCREAS	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. EXOCRINE AND ENDOCRINE PANCREAS.** Pancreatic exocrine atrophy and hyperplasia. Acute pancreatitis and pancreatic necrosis. Chronic pancreatitis and pancreatic fibrosis. Pancreatic neoplasms.

UNIT 8.- NERVOUS SYSTEM	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. CENTRAL AND PERIPHERAL NERVOUS SYSTEM.** Cytopathology of the Nervous System. Congenital malformations. Inflammation of the Nervous System. Malacia. Neurotoxicity. Neoplasms of the Nervous System.
UNIT 9.- HAEMATOPOIETIC SYSTEM	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. BONE MARROW, THYMUS AND LYMPHATIC NODES.** Bone marrow aplasia. Multiple myeloma. Feline leukemia and immunodeficiency. Avian and bovine leukosis. Thymic neoplasms. Lindadenitis. **SPLEEN.** Differential diagnosis of splenomegaly. Differential diagnosis of splenic masses.
UNIT 10.- LOCOMOTOR SYSTEM	**BASIC CONCEPTS OF STRUCTURE AND FUNCTION. SKELETAL MUSCLE.** Tissue response to muscle damage. Patterns of muscle injury. Rhabdomyolysis and Rhabdomyositis. **BONE AND JOINTS.** Genetic-based bone pathologies. Metabolic-nutritional bone pathologies. Osteomyelitis. Arthritis and Osteoarthritis. Bone and joint neoplasms.

Organization of the practical activities:

	Content	Place	Hours
PR1.	Clinical necropsy sessions nº1	Hospital	12,00
PR2.	Clinical necropsy session nº2	Hospital	12,00
PR3.	Slaughterhouse rejected viscera	Hospital	4,00
PR4.	Slaughterhouse visits	Technical visit	2,00
PR5.	Histopathology	Lecture room	6,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
INTRODUCCTION TO VETERINARY PATHOLOGY	1,00	2,00
UNIT 1.- CARDIOVASCULAR SYSTEM	5,00	10,00
UNIT 2.- RESPIRATORY SYSTEM	5,00	10,00
UNIT 3.- URINARY SYSTEM	5,00	10,00
UD 4.- REPRODUCTIVE SYSTEM	5,00	10,00
UNIT 5.- DIGESTIVE SYSTEM AND PERITONEUM	6,00	12,00
UNIT 6.- LIVER	5,00	10,00
UNIT 7.- PANCREAS	3,00	6,00
UNIT 8.- NERVOUS SYSTEM	4,00	8,00
UNIT 9.- HAEMATOPOIETIC SYSTEM	3,00	6,00
UNIT 10.- LOCOMOTOR SYSTEM	3,00	6,00

References

Veterinary Pathology: https://journals.sagepub.com/home/vet
Zachary, J.F. (2022). **Pathologic Basis of Veterinary Disease**. 7th ed. Elsevier.
Maxie, M.G. (2015). Jubb, Kennedy & Palmer's - **Pathology of Domestic Animals**: 3-Volume Set, 6th ed. Saunders Ltd.
Vandevelde M. (2012). **Veterinary Neuropathology**, Essentials of Theory and Practice. Wiley-Blackwell.
Meuten DJ (2016). **Tumors in Domestic Animals**, Fifth Edition. John Wiley & Sons.
Blowey, R.W., Weaver, A.D. (2011). **Color Atlas of Diseases and Disorders of Cattle**. Ed. Mosby.
Ferrer, L.M.; García De Jalón, J.A. Y De Las Heras, M. (2002). **Atlas de Patología Ovina**. Servet.
Claus D. Buergelt (2013). **Color Atlas of Equine Pathology**. John Wiley & Sons.
De Las Heras, M (2001). **Guía de diagnóstico de necropsia en patología porcina**. Servet.
Majó Masferrer, Natàlia (2018). **Atlas de la necropsia aviar**: Diagnóstico macroscópico y toma de muestras. Servet.
Barthold SW (2016). **Pathology of Laboratory Rodents and Rabbits**, Fourth Edition. Wiley-Blackwell.
Turner PV (2017). **Pathology of Small Mammal Pets**. Wiley-Blackwell.
Schmidt RE (2015). **Pathology of Pet and Aviary Birds.** Wiley-Blackwell.
Jacobson ER (2021). **Infectious Diseases and Pathology of Reptiles**, Color Atlas and Text, Vol 1. CRC Press.
Jacobson ER (2020). **Noninfectious Diseases and Pathology of Reptiles**, Color Atlas and Text, Vol 2. CRC Press.
Karen A. Terio, Denise Mcaloose, Judy St. Leger (2018). **Pathology of Wildlife and Zoo Animals**. Elsevier Science, First Edition.