



VETERINARY NURSING


Year 1

Curriculum Units	Semester	Contact Hours	ECTS	Type	Obs
Biochemistry	I	96	6	C	
Behavior and Training of Companion Animals	I	48	3	C	
Statistical Methods and Computing	I	96	6	C	
General Animal Husbandry	I	112	6	C	
Food Safety and Quality Control	I	48	3	C	
Animal Anatomy	I	64	6	C	
Microbiology and Immunology	II	64	6	C	
Animal Hygiene Care and Aesthetics	II	48	3	C	
Parasitology and Parasitic Diseases	II	112	6	C	
Animal Physiology	II	80	6	C	
English	II	48	3	C	
Animal Cytology and Histology	II	64	6	C	

C – Compulsory; PC – Personal Choice

 Curriculum Units available to foreign students according to conditions described

Curriculum Unit	Biochemistry
Contents	<u>Introduction</u>
	What is biochemistry? Areas of application
	The cellular localization of metabolic processes
	The biological molecules
	Water. Intermolecular bonds (molecular interactions)
	Solubility at pH buffer solutions
	<u>Amino acids and proteins</u>
	Connect peptide - A polypeptide chain
	Secondary structure
	Tertiary structure
	Quaternary structure and folding
	Separation techniques
	Protein synthesis
<u>Nucleic acid</u>	
Structure, function and relevance	
Biosynthesis of DNA and RNA	
Influence of temperature and pH on enzymatic activity	
Regulation of enzymatic activity	
Vitamins and coenzymes	
<u>Enzymes</u>	
<u>Biochemical Energy</u>	
ATP formation	
Electron transport chain – generation of ATP	
<u>Carbohydrates</u>	
Structure	
Metabolism of glucose	

	<p>Glycolysis Decarboxylation of pyruvic acid to acetyl-CoA Krebs cycle and glyoxylate cycle Gluconeogenesis The pentose phosphate pathway</p> <p><u>Lipids</u></p> <p>Structure and classification Oxidation of fatty acids Biosynthesis of fatty acids</p> <p><u>Metabolism integration</u></p>
Evaluation	<p>Alternative 1: continuous evaluation (practices at the laboratory) Alternative 2: continuous evaluation (2 tests, protocols and practical exams: 37,5% + 37,5% + 25%) Alternative 3: global exam (75% exam + 25% protocols and practical exam) Previous inscription will be necessary for online exams</p>
	<p>This Curriculum Unit is available for foreign students in English and Spanish.</p> <p>Foreign students are expected to follow classes and participate in all activities assigned, either live or through the e-learning platform. If the final practical work is submitted by a group which includes Portuguese and foreign students, the latter have to write a summary in English or Spanish. If the final practical work is submitted individually or by a group of foreign students only, it has to be fully written in English or Spanish.</p>

Curriculum Unit	Behavior and Training of Companion Animals
Contents	<p>Production and different uses of dogs. Specific breeds and production systems of dogs. General management of dogs especially during some specific stages of their life cycle. Growth and development of puppies. Physiology of behavior: social, eating, sexual, clinical and abnormal behaviors. General and specific well-being, stress. Aspects of the behavior and characteristics of senses in various breeds of dogs related to their uses. Training of dogs aiming a specific function, obedience, behavior modification and rehabilitation of temperament. Main pathologies and problems of different production systems. Technical and methods used on animal training. Types of dogs and methodologies used.</p>
Evaluation	<p>Evaluation is made through a final theoretical written exam (80%) and also by the presentation of final group works (20%) corresponding to both theoretical and practical examination.</p>

Curriculum Unit	Statistical Methods and Computing
Contents	<p><u>PART I – STATISTICAL METHODS</u></p> <p><u>Introduction to Descriptive Statistics</u></p> <p>Definition of statistics Population and statistical universe Purpose of statistics Descriptive and inductive statistics</p> <p><u>Descriptive Statistics</u></p> <p>Discrete and continuous variables Frequency distribution Graphical representation of frequency distributions Measures or indicators</p>

	<p>Measures of central tendency or location. Measures of dispersion</p> <p>Correlation and simple linear regression</p> <p><u>Random variables</u></p> <p>Discontinuous or discrete random variables</p> <p>Continuous random variables</p> <p><u>Theoretical probability distributions. Their relationships</u></p> <p>Discrete distributions: Binomial, Poisson</p> <p>Continuous distributions: normal, X square, F-snedcor, T-student</p> <p><u>Statistical Inference</u></p> <p>Data analysis, inference and confidence intervals</p> <p>Estimation</p> <p>Statistical decision theory, hypothesis testing and significance</p> <p><u>Experimental Design</u></p> <p>Bases for experimental design</p> <p>Analysis of variance</p> <p>Multiple comparison of means</p> <p><u>PART II - USE OF SPREADSHEET IN THE CONTEXT OF STATISTICAL METHODS</u></p> <p>The spreadsheet and its basic features</p> <p>Mathematical analysis and statistics</p> <p>Linear programming</p> <p>Hypothesis testing and simulation data</p> <p>Using advanced analysis tools</p> <p><u>PART III - MANAGEMENT SYSTEM DATABASE</u></p> <p>Database: definition and concepts</p> <p>Introduction to the concept of designing a Database</p> <p>Entity-Relationship Diagram</p> <p>Construction of Databases</p>
Evaluation	<p>Alternative 1: two tests (45% + 45%) and practical part (10%)</p> <p>Alternative 2: two tests (50% + 50%)</p> <p>Alternative 3: global exam (100%).</p>

Curriculum Unit	General Animal Husbandry
Contents	<p>Animal Husbandry is responsible for the first approach to the general characteristics of the main animal production species focused in the Veterinary Nursing course. Students should be able to recognize the external characteristics of that species, to be acquainted with their identification methods and housing systems and to distinguish the main production cycles features of the local and foreign breeds reared in Portugal with the aim of production systems profitability.</p> <p>General overview of the local edaphic and climatic characteristics towards animal production.</p> <p>Study in cattle, sheep, goats, pigs, poultry and horses:</p> <ol style="list-style-type: none"> 1) Nomenclature of body's external regions and features; 2) Types and classification of skin covering structures; 3) Age estimation methods; 4) Methods, systems and legislation of animal identification.

	<p>5) Portuguese breeds and foreign breeds occurring more frequently in Portugal: origin, distribution area, national heard, morphological features and main productive purposes.</p> <p>6) Main production systems biological/productive/reproductive cycles, general aspects of animal housing</p>
Evaluation	The students' knowledge is evaluated along the term with two interim written tests (30% each) and practical subjects (40%) or, at the end of the term with a written examination including theoretical (80%) and practical subjects (20%).

Curriculum Unit	Food Safety and Quality Control
Contents	<p>1. Food Safety</p> <p>1.1. Applicable law and best practices</p> <p>1.2. Importance within the sector</p> <p>1.2.1. European Authority of Food Safety</p> <p>1.3. Food Safety hazards</p> <p>1.3.1. Physical hazards</p> <p>1.3.2. Chemical hazards</p> <p>1.3.3. Biological hazards</p> <p>2. Quality control</p> <p>2.1. Concept and definition</p> <p>2.2. Legislation and standards</p> <p>2.2.1. Overall approach to NP EN ISO 9000:2008 and NP EN ISO 22000:2005 norms</p> <p>2.3. Audit and certification</p> <p>2.3.1. Concept and applicability</p> <p>2.4. Quality control methods and analytical techniques</p>
Evaluation	<p>Alternative 1: two mid-term exams, one theoretical (70%) and one practical (30%)</p> <p>Alternative 2: two final-term exams, one theoretical (70%) and one practical (30%)</p>

Curriculum Unit	Animal Anatomy
Contents	<p><u>Theoretical classes</u></p> <p>Definition of anatomy and anatomical concepts.</p> <p>Anatomical symmetry.</p> <p>Bone description and articular/non-articular surfaces</p> <p>General osteology: skull, vertebral column, thorax, thoracic and pelvic limb</p> <p>Comparative osteology between ruminants, equine, swine, dog, cat, rabbit and chicken</p> <p>General myology: main muscles of the head, neck, thoracic, abdominal, thoracic and pelvic limbs</p> <p>Comparative splanchnology: digestive system and accessory glands, respiratory system, urogenital system and lymphatic system (ruminants, equine, swine, dog and cat)</p> <p><u>Practical classes</u></p> <p>Comparative osteology of the domestic mammals (ruminants, equine, swine, dog and cat)</p> <p>General myology and arthrology</p> <p>Splanchnology – animal necropsy and carcass dissection</p>
Evaluation	<u>Theoretical part (50% final classification)</u>

	<p>Alternative 1: two tests (40% + 40%) and a monography focused on a theme proposed by the teacher (20%).</p> <p>Alternative 2: global exam (80%) and monography focused on a theme proposed by the teacher (20%).</p> <p><u>Practical part (50% final classification)</u></p> <p>Alternative 1: continuous evaluation and mandatory presence at practical classes. Two tests (50%) and a practical evaluation (50%)</p> <p>Alternative 2: a practical and/or oral global exam (100%)</p>
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Curriculum Unit	Microbiology and Immunology
Contents	<p><u>Theoretical classes (microbiology)</u></p> <ol style="list-style-type: none"> 1. Introduction to Microbiology in veterinary science <ul style="list-style-type: none"> Basic concepts Main groups of microorganisms Characterization and classification of the microorganisms 2. Bacteriology <ul style="list-style-type: none"> Groups of bacteria and their classification Characteristics of bacteria cells Bacterial ecology and bacterial infections Gram positive and Gram negative Rickettsias and Chamydial infections in domestic animals Mycoplasma infections in domestic animals 3. Virology <ul style="list-style-type: none"> Main virus characteristics Classification of virus Main viral infections in domestic animals 4. Prions in animal pathology. 5. Mycology <ul style="list-style-type: none"> Classification of fungus Characteristics and biology of fungus Principal fungal infections in domestic animals 6. Food borne diseases <ul style="list-style-type: none"> Basic concepts Food and water analysis <p><u>Theoretical classes (immunology)</u></p> <ol style="list-style-type: none"> 1. The immune system and immunocompetent cells 2. Immunoglobulins 3. Antigenic processing, T-cell antigenic receptor, cytokines and interleukins 4. Complement system 5. Immunodeficiencies 6. Autoimmunity 7. Hypersensitivities and allergies 8. Passive and active immunization – vaccines <p><u>Practical classes</u></p> <ol style="list-style-type: none"> 1. Microbiology science and society 2. Optical Microscopy 3. Sterilization and aseptic techniques in microbiology 4. Culture techniques and microorganismes isolation 5. Culture techniques and fungal isolation 6. Gram technique 7. Quantification of microorganisms
Evaluation	<p><u>Microbiology (50% final classification)</u></p> <p>Theoretical evaluation: one test or a final global exam (80%)</p> <p>Practical evaluation: mandatory presence at all practical classes. One or two laboratorial reports and a final exam (20%).</p>


	<u>Immunology (50% final classification)</u> Theoretical evaluation: two tests or a final global exam (100%).
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Curriculum Unit	Animal Hygiene Care and Aesthetics
Contents	<ol style="list-style-type: none"> 1. General preventive hygiene care. 2. Animal aesthetics. Definition and concepts. 3. Integument: Constitution and function 4. Annexes of the skin 5. Hair: constitution and cycle. 6. Different coats in pets 7. Coat and hair varieties: simple color coats, multicolored coats; variations in length - no hair, flat hair, short hair, semi-long hair, long hair; variations in texture - rough, freckly (wire), silky, woolly; variations in diameter and distribution; form - wavy, crimped, flat, curly; variations in age, brightness, shearing, changes 8. Skin lesions. 9. Auxiliary diagnostic techniques in dermatology. 10. Dentistry: General characteristics and formation of teeth. Pathologies: retention, supernumerary, malocclusion, fistulas, scaling and cleaning. 11. Ears: structure, body care, situations and possible solutions 12. Hair care: bath and brushing; shearing and trimming; grooming. 13. Anal glands: structure and functions. Situations and possible solutions. Emptying the bags
Evaluation	<p>Theoretical and practical classes are evaluated by the sum of:</p> <ul style="list-style-type: none"> - Test or final exam (50%) - Presentation of a final group work (35%) - Practical performance at classes (10%) - Active participation in classes (5%)

Curriculum Unit	Parasitology and Parasitic Diseases
Contents	<p>The aim of the course is to provide students with a general knowledge about the major parasites and parasitosis that affect domestic animals in Portugal. Sensitize students to the importance of some parasites that are zoonotic. Students should be able to know and identify the general characteristics, life cycle and distinguishing different classes of parasites. Identify the type of pathophysiological changes that cause these parasites in their hosts. Provide students with the ability to develop laboratory techniques for the parasitological diagnosis and interpretation of the obtained results.</p> <p>Relationship host / parasite. Biological types of associations, forms of parasitism, parasitic adaptation, localization of parasites, modes of entry, spread and exit of parasites. Clinical and Parasitological periods. Effects of parasites in the host. Systematic.</p> <p>Helminthology: Nematoda, Trematoda and Cestoda Families. Study of Arthropods and Protozoa in different animal species. Parasitic Diseases of some animal species (Importance on pets,</p>

	work and economic and Public Health); Pathogenesis, Symptoms and injuries; Diagnosis, Prophylaxis and Treatment. Parasitic Diseases of Dogs and Cats, Equines and Exotic Pets. Methods of sampling, conservation techniques for Coprology and identification of parasitic forms. Blood smears and stains. Observation of protozoa and helminthes. Necropsies.
Evaluation	Theoretical and practical classes are evaluated by the sum of: <ul style="list-style-type: none"> - Written test or final global exam evaluating the contents if theoretical classes (60%) - Knowledge of the techniques applied and reports made after the protocols (40%)


Curriculum Unit	Animal Physiology
Contents	Systems, mechanisms and adaptations Endocrinology: hormones and hormonal mechanisms of action Thermoregulation Blood and circulatory system Respiratory system and cycles Muscular tissue physiology Digestive system and accessory glands Renal physiology and acid-base balance Nervous system
Evaluation	Alternative 1: one or two tests (80%) and a monography proposed by the teacher (20%) Alternative 2: global written exam including all the contents lectured (100%)

Curriculum Unit	English
Contents	This English course is aimed at students whose current level of English is less than B2 on the Common European Framework of Reference for Languages. The course revises 4 basic English structures so that the students can distinguish between and use tenses that express Present, Past and Future time concepts in all language skills: listening, reading, writing and speaking. In addition lexis that reflects their future potential employment possibilities is introduced and practiced, for example names of domestic and wild animals, basic animal anatomy, basic clinical equipment.
Evaluation	Given the very practical nature of language acquisition, there is a 70% attendance requirement for this course. Evaluation is as follows: Written Test; 70%, Classroom Participation and Demonstration of Oral Abilities; 20%, Individual Written Work (done out of the classroom); 10%. Worker students for whom there is no attendance requirement will have to take an oral test to replace the classroom participation grade.
	This course is available to foreign students and is completely conducted in English. Foreign students are expected to follow classes and participate in all activities assigned.

Curriculum Unit	Animal Cytology and Histology
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<p>Contents</p>	<p>The curricular unity will be divided in two chapters: cytology and histology. In the first one we pretend that the students acquire knowledge about the structure and operation mode of the animal cell, as well as the techniques for obtaining and management of cytological specimens. Get skilled in the use of the light microscope and its use in veterinary medicine. In the histology module the goal is the theoretical and practical knowledge of the microscopic structure of the multiple organs, systems and tissues of the domestic animals, relating this knowledge with the functions they perform. Students should also know the main techniques used in the study of cells and tissues, as well as control the use of the microscope in this area.</p> <p><u>Theoretical classes</u></p> <p>Cellular diversity. Microscopes, microscopic techniques and other study forms of the cell. Cells and its structures. Main techniques used in the animals' tissues study. The animal tissues: epithelial, connective, muscular and nervous.</p> <p>Study of the histology and histophysiology of the main systems of domestic animals body: circulatory system, skin and mammary gland, digestive system (gastro gastrointestinal tract; liver, gallbladder and pancreas); respiratory system; urinary system; endocrine organs and male and female reproductive systems.</p>
<p>Evaluation</p>	<p>Students are assessed in partial (just theoretical) or a final examination that includes a laboratory work (identify of histological sections) and a theoretical test. The final mark is the result of the weighted average of the laboratory mark (25%) and theoretical test (75%)</p>

Year 2

Curriculum Units	Semester	Contact Hours	ECTS	Type	Obs
Marketing and Communication Techniques	I	48	3	C	
Clinical Analysis	I	64	6	C	
Entrepreneurship	I	48	3	C	
Animal Nutrition	I	64	6	C	
Medical Pathology	I	96	6	C	
Introduction to Pharmacology	I	64	6	C	
Fundamentals of Anesthesiology and Surgical Technique	II	96	6	C	
Nursing in New Companion Animals Clinic	II	48	3	C	
Complementary Methods of Diagnosis	II	64	6	C	
Animal Reproduction and Obstetrics	II	64	6	C	
Nursing in Infectious Diseases Clinic	II	80	6	C	
Elective I – Physiotherapy in Companion Animals/ Administration and Management	II	48	3	PC	

C – Compulsory; PC – Personal Choice

 Curriculum Units available to foreign students according to conditions described

Curriculum Unit	Marketing and Communication Techniques
Contents	<p>PART I – MARKETING</p> <ol style="list-style-type: none"> 1. Marketing concept. Introduction. Evolution of the marketing concept. 2. Attitudes, techniques and marketing models. 3. Market. Market definition. SWOT Analysis. 4. Consumer behaviour. The main information collected about consumers. Theories of consumer behaviour. 5. Segmentation and positioning. Reasons and segmentation process. Main targeting criteria. Positioning. 6. Marketing mix. Product management. Price management. Distribution management. Communication management. 7. Elaboration of a marketing plan 8. The planning and control of marketing. 9. Online marketing. <p>PART II – COMMUNICATION TECHNIQUES</p> <ol style="list-style-type: none"> 1. Importance of customer oriented company. The importance of good customer service for the organization 2. Core competencies of professionals in attendance. Effective communication 3. Identify customer needs and propose adjusted solutions 4. Phases of the Service. Importance of first impact with the client. Understanding the customer's request: questions. How to present solutions in a convincing and persuasive manner. Dealing with objections. Reformulation: essential technique in winning customer confidence. 5. Solve potential conflict situations appropriately. Resolution of complaints 6. Specifics of telephone communication. 7. Sales.
Evaluation	Sessions of the theoretical discussion and debate; Presentation of demonstrative examples and critical; Resolution of a practical case, assuming the active participation of students in class. Final written evaluation.

	<p>Alternative 1: group work (50% of grade – from which 50% written work and 50% presentation) and final written test (50%).</p> <p>Alternative 2: final examination (100%)</p>
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Curriculum Unit	Clinical Analysis
Contents	<p><u>Theoretical classes</u></p> <p>General conditions about laboratory and clinical diagnosis. Hematology: blood formation, hematopoiesis, sampling techniques in different species, different types of anticoagulants, blood count, hematocrit, automatic and manual cellular count, biochemical blood, ESR. Urinalysis: urine formation, constituents, analysis and urinary sediment. Biopsies and cytology. Necropsy. Analysis of body cavities liquids Serological tests. Rapid diagnostic tests.</p> <p><u>Practical classes</u></p> <p>Material and laboratory equipment in a laboratory of analysis. Preparation of animals and equipment for sampling. Methods of blood collection in different animal species. Blood and blood cells. Methods of preservation of blood. Hemolysis and lipemia phenomena. Anticoagulants. Sending samples to the laboratory. Methods of manual and automatic cell count. Blood smears, coloring and visualization (identification). Cell volume, hematocrit and microhematocrit. Procedures for determining biochemical parameters: glucose, serum total protein, total cholesterol, creatinine, ALT, AST, minerals and others. Urine collection. Urinalysis. Collecting body fluids for laboratory examination. Computerization of data. Conducting reports. Biopsies and cytology. Autopsies and liquid collection of the different cavities.</p>
Evaluation	<p>Alternative 1: sum of two tests (35% each) and 30% of practical evaluation (practices, protocol preparation and work discussion)</p> <p>Alternative 2: final exam (70%) and practical evaluation (30%)</p>

Curriculum Unit	Entrepreneurship
Contents	<p><u>1. Entrepreneurship</u></p> <p>1.1 – What is entrepreneurship</p> <p>1.2 – The entrepreneur profile</p>

	<p>1.3 – How to measure entrepreneurship</p> <p><u>2. Innovation</u></p> <p>2.1 – What is innovation</p> <p>2.2 – Some innovation models</p> <p>2.3 – How to measure innovation</p> <p>2.4 – The relationship between innovation and entrepreneurship</p> <p><u>3. From the idea to a business</u></p> <p>3.1 – Basic notions of mathematical finance</p> <p>3.2 – Basic notions of accounting</p> <ul style="list-style-type: none"> * Main financial statements * Analysis of financial statements <p>3.3 – Investment project</p> <ul style="list-style-type: none"> * Investment planning * Financial planning * Provisional budgets * Descriptive information of a project <p>3.4 – Evaluation of investment projects</p>
Evaluation	<p>Sessions of the theoretical discussion and debate; Presentation of demonstrative examples and critical; Resolution of a practical case, assuming the active participation of students in class. Final written evaluation.</p> <p>Alternative 1: Group work (50% of grade – from which 60% written work and 40% presentation) and final written test (50%).</p> <p>Alternative 2: final examination (100%)</p>

Curriculum Unit	Animal Nutrition
Contents	<p><u>Theoretical classes</u></p> <p>Major components of food: water and dry matter (carbohydrates, lipids, proteins, vitamins, minerals and enzymes)</p> <p>Review of the digestive tracts of the horse, cattle, sheep, pig, dog and cat</p> <p>Digestion in monogastric mammals, ruminants and other herbivores</p> <p>Endocrinology of metabolism and energy obtainment: synthesis of proteins, fatty acids and carbohydrates</p> <p>Determination of digestibility: trials and coefficients</p> <p>Energetic contents of food: metabolizable energy</p> <p>Protein needs and measurement</p> <p>Food additives</p> <p>Nutritional characteristics of animal food: pasture and forage crops, silage, hay, cereals and byproducts, concentrates, etc.</p> <p>Toxic plants</p> <p><u>Practical classes/seminars</u></p> <p>Bovine nutrition and body score</p> <p>Sheep and goat main nutritional features</p> <p>Swine nutrition</p> <p>Small animal regular and therapeutic nutrition</p> <p>Proximate analysis: water and dry matter (crude ash, crude protein, ether extract, crude fiber and nitrogen-free extracts). Weende, Kjeldahl and Van Soest methods</p> <p>Feeding program: calculations and exercises</p> <p>Equine nutrition</p>

Evaluation	<u>Theoretical (50% final classification)</u> Alternative 1: two tests (40% each) and a monography proposed by the teacher (20%) Alternative 2: global written exam (80%) and a monography proposed by the teacher (20%) <u>Practical (50% final classification)</u> Alternative 1: one test (80%) and presentation of the monography Alternative 2: global written exam (80%) and presentation of the monography (20%)
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Curriculum Unit	Medical Pathology
Contents	General Pathology. General concepts Types of diseases Reversible and irreversible cell injury Inflammation Tissue repair Circulatory disorders Shock Clinical thermometry Necropsy Methodology of the semiotic exploration. General physical examination Semiology and pathology of the digestive system Semiology and pathology of liver diseases Semiology and pathology of pancreas Semiology and pathology of the respiratory system Semiology and pathology of the cardiovascular system Semiology and pathology of the blood Semiology and pathology of the urinary system Semiology and pathology of the nervous system
Evaluation	Alternative 1: Theoretical evaluation: 2 tests (90%). Attendance at practical classes and participation in lectures and practical classes (10%) Alternative 2: final global exam (100%)

Curriculum Unit	Introduction to Pharmacology
Contents	<u>Theoretical classes</u> General concepts Therapeutic forms of administration in domestic animal Anti-inflammatory drugs and topical therapeutic Ethiotropic drugs <ul style="list-style-type: none"> Quimiotherapeutical drugs Antibacterial drugs Antibiotics Antifungal drugs Antiparasitary drugs Antiviral drugs Organotropic drugs <ul style="list-style-type: none"> Central nervous system drugs Autonomous nervous system drugs Motor plate drugs Cardiovascular system drugs Respiratory system drugs

	<p>Gastrointestinal tract drugs Urinary system drugs Genital system drugs Veterinary Toxicology <u>Practical techniques</u> Drug administration techniques in domestic animals Pharmaceutical forms in veterinary science Manipulation and administration of biological products Manipulation and administration of cytostatic drugs Animal contention techniques Tables and calculus in veterinary medicine</p>
Evaluation	<p>Theoretical part (80% final classification): two tests (50% each) or a final written exam (100%) Practical part (20% final classification): group work or one test or a final written exam.</p>


Curriculum Unit	Fundamentals of Anesthesiology and Surgical Technique
Contents	<p><u>Theoretical classes</u> Anesthesia and analgesia in veterinary practice. Pre-anesthesia evaluation of the patient. Pre-anesthesia medication of the patient. Principal anesthetic techniques in veterinary practice. General anesthesia. Intra-anesthetic care and monitoring of the anesthetized patient. Main anesthetic complication and accidents. Prevention and control. Surgical techniques. Healing and regeneration of tissues. Tissue division and hemostatic techniques. Surgical instruments. Types, designation and manipulation care. Operating room preparation. Patient preparation. Surgical team preparation. Suture techniques in veterinary practice. Types, material and suture patterns. Bandages in veterinary practice. <u>Field and clinical practices</u> Administration of anesthetics. Intubation techniques. Inhalation anesthesia. Sterilization and aseptic techniques. Anesthetic techniques and surgery in large animals.</p>
Evaluation	<p>Theoretical part (65% final classification): two tests (50% each) or a final written exam (100%). Practical part (35% final classification): internship evaluation (30%) and a case report (5%).</p>

Curriculum Unit	Nursing in New Companion Animals Clinic
Contents	<p>Introduction: general concepts, legislation in this area, detention of exotic species, environmental enrichment techniques Husbandry of small mammals, birds, reptiles and amphibians. For each species: general information, most common breeds, anatomical peculiarities, physiological particularities, behavioral peculiarities, housing, environmental enrichment, feeding. Consultation and hospitalization of small mammals, birds, reptiles and amphibians. For each species: restraint, clinical examination, conditions in hospitalization, therapeutic techniques and anesthesia</p>

	Most frequent pathologies in small mammals, birds, reptiles and amphibians
Evaluation	Alternative 1: 2 tests (50% each) Alternative 2: global final exam (100%)

Curriculum Unit	Complementary Methods of Diagnosis
Contents	<p><u>Theoretical classes</u></p> <ol style="list-style-type: none"> 1. Radiology 2. Fluoroscopy and computerized tomography 3. Scintigraphy 4. Magnetic resonance imaging 5. Ultrasound 6. Electrocardiography 7. Endoscopy 8. PCR (Polymerase Chain Reaction) <p><u>Practical classes</u></p> <ol style="list-style-type: none"> 1. Radiology: film processing, radiographic identification, patient preparation, radiation protection, realization of the main radiographic projections, radiography in horses 2. Preparation of the patient for fluoroscopy, computerized tomography and magnetic resonance 3. Preparation of the patient for scintigraphy 4. Ultrasound: patient preparation for abdominal ultrasound and echocardiography, patient and material preparation for invasive procedures ultrasound guided 5. Electrocardiography: electrocardiograph calibration, patient preparation, realization and interpretation of ECG tracings 6. Endoscopy: patient preparation for endoscopy of the gastrointestinal tract, respiratory system, arthroscopy, urinary tract endoscopy and laparoscopy, endoscopy reprocessing.
Evaluation	Alternative 1: two mid-term tests that intend to evaluate the theoretical and practical contents (90%) and reports of practical classes orally presented (10%) Alternative 2: global final exam (100%)

Curriculum Unit	Animal Reproduction and Obstetrics
Contents	<p>Anatomy and physiology of female and male reproductive tract. Endocrinology and regulation of estrous cycles. Fertilization, embryonic development, gestation, lactation and birth. Reproduction in carnivores: physiology and endocrinology. Vaginal cytology, semen collection and evaluation, artificial insemination. Reproductive management and surgery. Gestation and birth. Main pathologies found in dogs and cats (male and female).</p> <p>Reproduction in equines: physiology and endocrinology. Gestation and birth, pathologies associated with the reproductive system (male and female). Assisted reproduction techniques</p> <p>Reproduction in bovines: physiology and endocrinology. Herd fertility management, main pathologies in male and female</p>

	<p>Reproduction in small ruminant: physiology and endocrinology. Herd fertility management, main pathologies in male and female Reproduction in small swine: physiology and endocrinology. Reproductive management, main pathologies in male and female Reproduction in rabbits: physiology and reproductive management. Main pathologies Reproduction in birds: physiology and some of the most common pathologies.</p>
Evaluation	<p>Theoretical part (50% final classification): two tests (50% each) or a final written exam (100%) Practical part (50% final classification): one test or a final written exam (35%) and a practical report (15%)</p>
	<p>This Curriculum Unit is available for foreign students in English and Spanish. Foreign students are expected to follow classes and participate in all activities assigned. If the final practical work is submitted by a group which includes Portuguese and foreign students, the latter have to write a summary in English or Spanish. If the final practical work is submitted individually or by a group of foreign students only, it has to be fully written in English or Spanish.</p>

Curriculum Unit	Nursing in Infectious Diseases
Contents	<p><u>Introduction to infectious diseases</u> <u>Main infectious diseases of the carnivores</u></p> <ol style="list-style-type: none"> 1. Rabies 2. Distemper 3. Parvovirus 4. Hepatitis 5. Kennel Cough 6. Feline leukaemia 7. Feline panleukopenia 8. Feline Infectious Peritonitis 9. Feline viral rhinotracheitis 10. Leptospirosis 11. Lyme disease 12. Ehrlichiosis 13. <u>Dermatophytosis</u> <p><u>Main infectious diseases affecting cattle</u></p> <ol style="list-style-type: none"> 14. Tuberculosis 15. Paratuberculosis 16. Brucellosis 17. Pasteurellosis 18. Salmonellosis 19. Colibacillosis 20. Foot and Mouth Disease 21. Listeriosis 22. Clostridial diseases 23. Mastitis 24. Bovine Spongiform Encephalopathy 25. Enzootic Leucosis 26. Mycoplasmosis 27. Bovine Viral Diarrhoea 28. Actinobacillosis <p><u>Main infectious diseases of small ruminants</u></p> <ol style="list-style-type: none"> 29. Contagious agalactiae 30. Contagious ecthyma

	<p>31. Caseous lymphadenitis 32. Blue tongue</p> <p><u>Frequent infectious diseases of swine</u></p> <p>33. Atrophic rhinitis 34. Enzootic pneumonia 35. Aujeszky's disease 36. Erysipelas 37. African and Classical Swine Fever 38. Swine influenza</p> <p><u>Main infectious diseases of birds</u></p> <p>39. Newcastle Disease 40. Avian Influenza</p> <p><u>Common infectious diseases in horses</u></p> <p>41. Infectious anaemia 42. Equine influenza 43. Equine plague 44. Glanders 45. Strangles 46. Tetanus</p> <p><u>Main infectious diseases of rabbit</u></p> <p>47. Myxomatosis 48. Haemorrhagic viral disease</p>
Evaluation	<p>Alternative 1: two tests (40% + 40%) and a monography focused on a theme proposed by the teacher (20%). Alternative 2: global exam (100%).</p>

Curriculum Unit	Elective I – Physiotherapy in Companion Animals
Contents	<p><u>Theoretical classes:</u> 1. Introduction to physical therapy in companion animals. 2. Basic concepts of physical therapy. 3. Pain pathophysiology. 4. Patient examination in rehabilitation. 5. Techniques in physical therapy - Massage and therapeutic exercises. 6. Electric stimulation and ultrasound. 7. Hydrotherapy and thermotherapy. 8. Delineate a physical therapy plan. 9. Physical therapy in cats. 10. Rehabilitation of geriatric patients. 11. Indications and classification of physiotherapy according to the injury / location. 12. Owner's role in physical therapy. 13. Economic Aspects of physiotherapy.</p> <p><u>Practical / Seminars:</u> 1. Physiotherapy examination. 2. Thermotherapy and electrotherapy. 3. Laser therapy. 4. Hydrotherapy. 5. Kinesiotherapy. 6. Preparation of physiotherapy protocols.</p>
Evaluation	<p>Theoretical part (70% final classification): two tests (50% each) or a final written exam (100%) Practical part (30% final classification): one test or a final written exam (20%) and a practical report or a group work (10%)</p>

Curriculum Unit	Elective I – Administration and Management
Contents	<p><u>1. Introduction</u></p> <p>1.1. The concept of organization 1.2. Firm. Concept, objectives and environment 1.3. The management. decisions 1.4. Manager functions 1.5. Organizational structures and organizational charts 1.6. System representation: flowcharts</p>

	<p><u>2. Marketing</u></p> <p>2.1. The concept of marketing 2.2. SWOT analysis 2.3. Segmentation, positioning and differentiation 2.4. Marketing-mix 2.5. Implementation and control 2.6. The Marketing Plan 2.7. Trading and sales techniques</p> <p><u>3. Resource materials and equipment management</u></p> <p>3.1 Strategy acquisitions 3.2 Stock management</p> <p><u>4. Human resource management</u></p> <p>4.1 Definition, objectives and functions of human resource management 4.2 Motivation 4.3 Analysis of the company's position in the labour market 4.4 Human resources strategy 4.5 Policies recruitment, careers, salaries, training and performance</p> <p><u>5. Strategic management</u></p> <p>5.1. Definition and objectives 5.2. Approach different strategies</p>
Evaluation	<p>Sessions of theoretical discussion and debate; Presentation of demonstrative and critical examples; Resolution of a practical case, assuming the active participation of students in class. Final written evaluation.</p> <p>Alternative 1: Group work (40% of grade – from which 60% written work and 40% presentation) and final written test (60%).</p> <p>Alternative 2: final examination (100%)</p>

Year 3

Curriculum Units	Semester	Contact Hours	ECTS	Type	Obs
Nursing in Equine Clinic	I	48	3	C	
Emergency and Hospital Care	I	64	6	C	
Nursing in Livestock Clinic	I	64	6	C	
Nursing in Small Animals Clinic	I	96	6	C	
Sanitary Inspection and Public Health	I	96	6	C	
Elective II – Nursing in Zoo Animals Clinic /Equine Physiotherapy and Osteopathy/Research Methodologies	I	48	3	PC	
Internship	II	60	30	C	

C – Compulsory; PC – Personal Choice

🇪🇺 Curriculum Units available to foreign students according to conditions described

Curriculum Unit	Nursing in Equine Clinic
Contents	<p><u>Theoretical classes</u> General horse management. Safety in clinical practice. Physical examination of horses and foals. Equine nutrition. Equine wellness program and first aids. General horse nursing and basic hospital activity. Laboratory diagnosis in equine practice. Fluid therapy. Foal care. Lameness and orthopedic nursing. Diagnostic procedures. Surgical assistance. Equine anesthesia. Common equine medical emergencies. Basic wound management in horses. Equine office procedures.</p> <p><u>Field practices</u> Horse management. Physical examination of horses and foals. Laboratory and diagnostic procedures in equine practice. Assistance and taking part in equine ambulatory clinic. Field emergencies in equine veterinary medicine.</p>
Evaluation	<p>Students are assessed in partial (just theoretical) or a final examination that includes a practical test (equine nursing duties and skills) and a theoretical exam. The final mark is the result of the weighed average of the practical mark (40%) and theoretical test (60%).</p>

Curriculum Unit	Emergency and Hospital Care
Contents	<p><u>Theoretical classes</u></p> <ol style="list-style-type: none"> 1. Job description and role of the Veterinary Nurse 2. Hospitalization service 3. Patient monitoring and daily medical record 4. Wound dressings 5. Fluid therapy 6. Blood transfusion and blood components 7. Nutrition in hospitalized animals 8. Emergency Service 9. Triage, approach to the patient 10. Vascular access techniques 11. Oxygen therapy and respiratory emergencies 12. Shock 13. Polytraumatic patients 14. Cardiopulmonary-cerebral resuscitation

	<p>15. Gastrointestinal, ophthalmological; toxicological; neurological and urinary emergencies.</p> <p><u>Practical classes</u></p> <ol style="list-style-type: none"> 1. Standards and basic biosecurity procedures 2. General physical examination and daily medical record 3. Dressings 4. Elaboration of fluid therapy plans 5. Collection and administration of blood, cross-match major and minor test 6. Nutritional Plans 7. Vascular access 8. Laboratory minimum data base in emergency medicine; 9. Advanced monitoring techniques 10. Dyspnea identification and classification (inspiratory, expiratory), oxygen therapy techniques 11. Basic life support 12. Euthanasia.
Evaluation	<p>Alternative 1: one test to evaluate theoretical contents (50%) and an oral evaluation including the realization of specific veterinary nursing techniques to assess practical subjects (50%).</p> <p>Alternative 2: final exam covering both theoretical and practical contents (100%).</p>

Curriculum Unit	Nursing in Livestock Clinic
Contents	<p><u>Theoretical classes</u></p> <p>Cattle management and manipulation. Safety in large animal practice. The clinical examination in cattle. Physical examination in sheep, swine and other large animals. Animal identification in cattle and sheep. Portuguese and European animal health plan for cattle and sheep. Large animal hospitalization. Main zoonoses in large animal practice. Basic principles of fluid therapy in ruminants. Metabolic diseases in cattle and sheep. Nursing in large animal obstetrics and reproduction. Calf, lamb and piglet care. The problem of mastitis in dairy cows. The principles of bovine podiatry. Basic approach of the neurologic patient. Anesthesia and monitoring in large animal surgery: field conditions. Assistance in large animal surgery. Nursing care and prophylaxis in feedlot cattle. Common large animal medical emergencies.</p> <p><u>Field practices</u></p> <p>The class will be divided in small groups (3-4 students) that will assist the teacher, when visiting farms, where they can perform several tasks like participate in cattle and sheep health plan, clinical examination of cattle, sheep and swine, large animal prophylaxis and general management, reproductive assistance, wound management and care, therapeutics and routine procedures, etc.</p>
Evaluation	<p>Students are assessed in partial (just theoretical) or a final examination that includes a practical test (livestock nursing duties and skills) and a theoretical exam. The final mark is the result of the weighted average of the practical mark (50%) and theoretical test (50%).</p>

Curriculum Unit	Nursing in Small Animals Clinic
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Contents	<p><u>Theoretical lectures</u> Introduction to small animal clinical practice. Manipulation and contention techniques in dogs and cats. Animal identification techniques. Legislation obligation in small animal detention and transport. Principal zoonotic diseases, revision of, control and prevention supports. Nosocomial infections in small animal practice. Hospitalization. Intensive care units. Fluid therapy in small animal practice. Nursing care in Intestinal tract pathology. Nursing care in respiratory pathology. Nursing care in urinary tract pathology. Nursing care in reproductive system. Nursing care in cardiovascular system. Nursing techniques in ophthalmology.</p> <p><u>Practical classes</u> Forms of drug administration in dogs and cats. Fluid therapy techniques. Intravenous catheterization. Urinary catheterization. Cistocentesis. Peritoneal dialysis. Endothraqueal intubation techniques. Thoracocentesis. Intervention in respiratory distress. Oxygenotherapy. Parenteral nutrition. Fecal analysis. Physical examination of male and female reproductive system. Vaginal cytology. Nursing care of the newborn. Artificial insemination techniques. Reanimation and resuscitation techniques. Hemorrhage control. Neurological examination.</p>
Evaluation	<p>Theoretical part (65% final classification): two tests (50% each) or a final written exam (100%) Practical part (35% final classification): internship evaluation (30%) and a case report (5%).</p>

Curriculum Unit	Sanitary Inspection and Public Health
Contents	<p>Sanitary Inspection and relevant definitions Regulation (EC) No 854/2004 Animal transportation, ante-mortem examination and animal welfare. Special examination procedures and semiotic evaluation by species and system Lymphatic vascular system and systematization of lymph nodes by species Post-mortem examination: general principles Slaughter methodology and hygiene by species Sanitary decision after post-mortem examination, final destination of the carcasses EUROP and other classification systems Sanitary inspection of fish: species classification, biotoxins and other contaminations. Decision criteria Sanitary inspection and surveillance in other alimentary products – HACCP Public health in Veterinary Medicine</p>
Evaluation	<p>Alternative 1: two tests (40% + 40%) and a monography focused on a theme proposed by the teacher (20%).</p>

	Alternative 2: global exam (80%) and monography focused on a theme proposed by the teacher (20%).
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Curriculum Unit	Elective II - Nursing in Zoo Animals Clinic
Contents	<p>General pathologic conditions West Nile virus in birds and mammals Diagnosis in Zoo animals: tuberculosis Zoonotic diseases and wildlife Training for a cooperative behavior and medical assistance Invertebrate conservation programs: disease monitoring Rehabilitation centers and ecosystems Fish: wildlife common pathologies Reptile and amphibians: general management and common diseases Wild birds kept in captivity: prevention and conservation. Frequent pathologies Mammals (rodents, primates and carnivores): general management and common diseases Aquatic mammals: general management and common pathologies Camelids and elephants: general management and common pathologies</p>
Evaluation	<p>Alternative 1: one or two midterm tests (40% each) and a monography proposed by the teacher (20%) Alternative 2: final written exam (100%)</p>

Curriculum Unit	Elective II - Equine Physiotherapy and Osteopathy
Contents	<p><u>Theoretical/Practical component</u> 1. Introduction to physiotherapy 2. Applied animal anatomy and physiology 3. Applied animal behavior: evaluation, pain and aggression 4. Applied equine biomechanics 5. Exercise physiology 6. Lameness in the horse 7. Equine neuromuscular condition 8. Physiotherapy management of animals 9. Massage: skin physiology, introduction to the technique 10. Electrotherapy principles in animal physiotherapy 11. Therapeutic methods and techniques used in equine physiotherapy: electrotherapy, ultrasound, low energy laser, thermic therapy, hydrotherapy and physiotherapeutic adjuvants 12. Basic principles of acupuncture 13. Rehabilitation and treatment of common lesions of sport horses</p> <p><u>Practical component:</u> Acquaintance and training in horses of the principles and techniques studied</p>
Evaluation	Ongoing evaluation of the students' performance during the classes. Final classification: 50% continuous evaluation and 50% global exam.

Curriculum Unit	Elective II - Research Methodologies
Contents	<p>I. Introduction: Importance of scientific work; development of scientific literature in Portugal; financing of scientific papers.</p> <p>II. Experimental design: The scientific method; setting objectives; experimental design; sampling, randomization and restrictions on random randomization; robustness and reliability of scientific results: statistical significance; critical analysis of scientific articles.</p> <p>III. Bibliographic search: the importance of the state of the art and implications for the experimental protocol; search engines and online scientific databases. Data processing: The MS Excel based tool in data analysis (using Analysis Tool Pack supplement). SPSS data analysis tool - practical application.</p> <p>IV. Publication of results: advertising media; Indexing and peer review; Examples of reference publications and copyright rules. Basic structure of a scientific paper.</p>
Evaluation	Students will be required to develop a structured work plan (50%) and the achievement of a critical comment to a research work (50%)

Curriculum Unit	Internship
Contents	<p>The Internship is essentially practical in nature and the undergraduate students are integrated into normal life of the organization / company / institution. The internship takes place in the 6th semester of the Curriculum and extends throughout the duration defined in the curriculum. In exceptional cases, the student can complete his internship in a different period if approved by the Course Director. The internship will be held in organizations, institutions or companies either public or private. Organizations, institutions or companies where the internship will occur will be defined by the School Board based on a proposal from the Course Director. Organizations, institutions or companies will be contacted in advance by the School Board or its representatives and a protocol will be signed for this purpose.</p> <p>Students can take the initiative to contact the organizations, institutions or companies where they wish to be placed. The organizations, institutions or companies to contact should operate in areas of activity consistent with the profile of the Curriculum or have departments or services similar in nature.</p>
Evaluation	<p>Each student or group of students will be supervised by a teacher at school (supervisor), under a proposal of the Course director. The organization, institution or company where the work placement takes place shall appoint a person responsible for its monitoring (advisor).</p> <p>The elements taken into account for assessment are as follows: internship plan; regular progress reports; quality assessment form for completion by the advisor; technical evaluation of the training venue; internship final report.</p>

