



Information about the subject

Degree: Bachelor of Science Degree in Veterinary Medicine

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 1261203 **Name:** Animal Physiology I

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

Module: Module of Common Basic Training

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

Field of knowledge: Health Sciences

Department: Basic and Cross-disciplinary Sciences

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
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Recommended knowledge

To have previous knowledge acquired in the areas of Biology, Anatomy, Embryology, Histology and Biochemistry.

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 knows and understands with a critical attitude the concepts that are included in the syllabus/contents of the module of animal physiology.
- R2 The student is able to solve problems related to the contents of the module.
- R3 The student knows how to use different working techniques in the laboratory.
- R4 The student is capable of working in a physiology laboratory correctly performing the basic operations both in the planning and development of each of the laboratory practices.
- R5 The student is able to write a comprehensible and organized text on various physiological aspects in the veterinary field.
- R6 The student searches bibliographic information from different sources and knows how to analyse it with a critical and constructive spirit.
- R7 The student is able to produce documents on animal physiology, working as a team.
- R8 The student argues according to rational criteria based on his or her work.



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
E7	Understanding and applying principles and bases of cellular excitability and communication.				X
E8	Knowing and applying principles and bases of body system operation and adjustment.				X
E9	Knowing and applying principles and bases of homeostasis.				X
E10	Knowing and applying principles, foundations and applications of the immune response.				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
R1, R5, R8	60,00%	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).
R3, R4, R8	0,00%	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.
R3, R4, R8	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.
R5, R6, R7, R8	5,00%	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.
R1, R2, R3, R4, R5, R6, R7, R8	5,00%	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

According to the general evaluation and qualification regulations, the preferred evaluation system will be by means of continuous evaluation. There will be a continuous evaluation of the theoretical and practical part of the course. After the teaching of the theoretical part of each didactic unit, there will be questionnaires in class type test, for the theoretical part, and of development for the practical part, imitating the evaluation system of both parts of the final exam of the course, and after the realization, it will be corrected in class so that all students receive feedback of their results.

The average mark must be equal to or greater than 50%, in written assessment and evaluation of the practical work in the laboratory, in order to be taken into account with the rest of the items. The rating of the approved test will be saved during the two sessions the following year. Attendance at practices is mandatory, so unjustified absence every one of the practices of the subject will be a discount of 10% of the final practice score.

MENTION OF DISTINCTION:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with 9 Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

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	R1, R2, R4, R8	44,00	1,76
Seminars (S) M2	R1, R4, R5	2,00	0,08
Computer Practice (CoP) M5	R1, R4, R5	2,00	0,08
Laboratory Practice (LP) M6	R1, R3, R4, R5	6,00	0,24
Clinical Practice (CP) M2	R1, R2, R3	2,00	0,08
Tutorial M8	R8	2,00	0,08
Evaluation (Ev) M9	R1, R2, R3, R4, R5, R6, R7, R8	2,00	0,08
TOTAL		60,00	2,40

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Group work M10	R5, R6, R7, R8	30,00	1,20
Individual work M11	R1, R5, R6, R7, R8	60,00	2,40
TOTAL		90,00	3,60



Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
DU1.- CELL PHYSIOLOGY	<p>ITEM 1. Introduction to animal physiology. Concept of physiology. Divisions and fundamental themes of physiology.</p> <p>ITEM 2. Cellular Physiology: Cell, functional unit of the body. Cell membrane. Membrane functions. Membrane potential. Regulation of cellular functions.</p>
DU2.- INTERNAL ENVIRONMENT	<p>ITEM 1. Body fluids. Composition of body fluids. Blood. Composition and functions. Hemostasis and blood coagulation. Homeostasis and regulation. Integration of biological functions. Levels of adaptation.</p>



DU3.- NEUROPHYSIOLOGY

ITEM 1. General Organization of the Nervous System. Electrical phenomena of synaptic transmission. Neurotransmitters. Nerve fiber. Neural circuits.

ITEM 2. Central Nervous System Elements of the Brain. Peripheral Nervous System. Overview of the Nervous System.

ITEM 3. Autonomic Nervous System. Sympathetic and parasympathetic divisions. Spinal and cranial nerves. Coordination of sympathetic and parasympathetic systems.

ITEM 4. General physiology of excitable cells. Concept of excitability. The neuron as a model of excitable cell. Electrical properties of excitable cells. Ion Channels.

ITEM 5. Local potential and action potential. Concept of local potential. Action potential. Action potential propagation. Muscle cell physiology. Neuromuscular junction. Regulation of muscle contraction.

ITEM 6. Signaling in the nervous system. Concept of synapses. Synaptic transmission. Synaptic regulatory mechanisms. Neurotransmitters and neuromodulators. Functional classification. Molecular classification. Integration into the synapse.

ITEM 7. Sensory mechanisms. General properties of sensory input. Concept of sensory receptor sensory transduction. Interpretation of sensory information.

ITEM 8. Vision. Structure and components of the eye. Retina. Photoreceptors. Visual pigments and phototransduction. Basic mechanisms of vision. Visual pathways. Visual perception.

ITEM 9. Chemoreception: taste and smell. Olfaction. Mechanoreceptors. Organization of the sensory pathways. Tactile receptors. Proprioceptors. Baroreceptors.

ITEM 10. Hearing. Basic concepts of sound and hearing. Hair cells. Sense of balance. Functional structure of the vestibular apparatus. Vestibular pathways.



DU4.- HORMONAL SYSTEM

ITEM 1 Concept of hormone. General types of chemical messengers Receptors: membrane receptors. Intracellular receptors. Second messengers. Mechanisms of hormone action.

ITEM 2 Hypothalamic-pituitary axis. Regulatory functions. Types of secretory cells. Classification of hormones. Hormones of the hypothalamus. Hormones of the neurohypophysis.

ITEM 3 Hormones of the adrenal cortex. Mineralocorticoids: Aldosterone. Glucocorticoids: cortisol. Sexulas corticosteroids. Atrial natriuretic peptide.

ITEM 4 Hormones of the endocrine pancreas: insulin. Mechanisms of insulin secretion. Regulation of glucose transport by insulin, the insulin receptor. Actions of insulin. Glucagon. Somatostatin. Pancreatic polypeptide.

ITEM 5 Hormones of the adenohipophysis. Pineal gland and melatonin. Functions of melatonin. Seasonal reproduction. Introduction to chronobiology. Biological rhythms and animal behavior.

ITEM 6 Thyroid hormones: T3 and T4. Biosynthesis and metabolic functions of thyroid hormones. Regulation of secretion. Physiological actions.

ITEM 7 Hormonal regulation of calcium metabolism. Parathyroid hormone and calcitonin. Adrenal cortex. Glucocorticoids Mineralocorticoids. Corticosteroids sex. Adrenal medulla. Biosynthesis and metabolism of catecholamines. Effect of catecholamines on the body. Regulation of secretion from the adrenal medulla.

ITEM 8 Hormones of reproduction. Gonads, androgens, estrogens, progesterone, relaxin, inhibin. Uterus: prostaglandins. Placenta: pregnant mare chorionic gonadotropin, placental lactogen.



DU5.- REPRODUCTION

ITEM 1. Reproduction in the female. Oogenesis and folliculogenesis. Ovulation. Luteinization and luteolysis. Oviduct. Uterus and cervix. Vagina. Lobby. Vulva. Clitoris. Estrous cycles in female domestic. Endocrine regulation. Menstrual cycle.

ITEM 2. Reproduction in the male. Testicular physiology: exocrine and endocrine functions. Testicular thermoregulation. Spermatogenesis. Excretory ducts. Epididymis. Accessory sex glands. Penis. Factors affecting sperm production.

ITEM 3. Puberty, mating and fertilization. Behavior during mating. Physiology of intercourse: sexual instinct. Transport of gametes. Fertilization.

ITEM 4. Physiology of pregnancy. Embryonic development. Implantation. Placentation. Fetal growth and development. Maternal-fetal recognition. Physiological changes during pregnancy.

ITEM 5. Physiology of partum and postpartum. Definition and stages of labor. Trigger mechanisms of delivery. Endocrinology delivery. Puerperium. Restoration of cyclic activity.

ITEM 6. Lactation. Mammogenesis. Lactogenesis. Physiological significance of colostrum to the newborn. Expulsion of milk: sucking reflex. Lactational anoestrus.

UD 6. PRACTICES

P.1 BLOOD COLLECTION

P.2 HEMATOLOGY 1

P.3 HEMATOLOGY 2

P4. MALE GAMETE

P. 5 FEMALE REPRODUCTIVE SYSTEM



Organization of the practical activities:

	Content	Place	Hours
PR1.	Equine handling and blood collection	Riding club	2,00
PR2.	Hematology 1: Obtaining plasma and blood serum. Hematocrit value. Plasma proteins	Laboratory	2,00
PR3.	Hematology 2: Hematologic stains. Blood cell count and differential count.	Laboratory	2,00
PR4.	Physiology of the male gametes.	Laboratory	2,00
PR5.	Physiology of the female gametes.	Laboratory	2,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
DU1.- CELL PHYSIOLOGY	2,00	4,00
DU2.- INTERNAL ENVIRONMENT	1,00	2,00
DU3.- NEUROPHYSIOLOGY	10,00	20,00
DU4.- HORMONAL SYSTEM	6,00	12,00
DU5.- REPRODUCTION	6,00	12,00
UD 6. PRACTICES	5,00	10,00



References

BASIC:

GUYTON A.C. Y HALL J. Tratado de fisiología médica. Interamericana-McGraw-Hill.

HILL R.W., WYSE G.A., ANDERSON M. Animal physiology. Sinauer Associates.

CUNNINGHAM J.G. Fisiología veterinaria. Elsevier.

COMPLEMENTARY:

ECKERT. Fisiología animal: mecanismos y adaptaciones. Interamericana-McGraw-Hill.

WILLIAM O.REECE. Dukes Fisiología de los animales domésticos. Acribia.

GARCÍA SACRISTÁN, A. Fisiología veterinaria. Interamericana-Mcgraw-Hill.

HAFEZ, E.S.E. Reproducción e inseminación artificial en animales. Interamericana-McGraw-Hill.

W.V. ENGELHARDT, G. BREVES. Fisiología veterinaria. Acribia.