APPENDIX

Teaching Guidelines

SELF EVALUATION REPORT
EAEVE – ZARAGOZA 2020

Index

Universidad Zaragoza

Year : 2018/19

28400 - Cytology and histology

Syllabus Information

Academic Year: 2018/19
Subject: 28400 - Cytology and histology
Faculty / School: 105 -
Degree: 451 - Degree in Veterinary Science
ECTS: 8.0
Year: 1
Semester: Annual
Subject Type: Basic Education
Module:

General information

Aims of the course

The general goal of "Cytology and Histology" is to study the structure and ultrastructure of cells and tissues and their organization to form various organs, grouped in turn into systems and apparatus in the animal organism.

The course takes part of the Basic Training Module and continues with the training process initiated with Anatomy, by developing the animal organism knowledge at a microscopic level

Context and importance of this course in the degree

Students will gain a thorough understanding to approach the study of other subjects of the Degree such as Physiology, Pathological Anatomy and other Pathologies

Recommendations to take this course

Basic knowledge of Anatomy, Biology, Chemistry and Biochemistry.

In order to carry out practical activities, safety recommendations must be followed, which must be taken into account. Students have all the information available in the following links, as well as in the ADD courses of each of the subjects:

https://veterinaria.unizar.es/estudiantes/formacion-prevencion-riesgos-y-seguridad#normas

https://veterinaria.unizar.es/prevencion/protocolosespecificosveteriaria

http://patologiaanimal.unizar.es/medidas-de-seguridad

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Know the structure of cells and identifying their organelles.
2. Understand the functions of these organelles and how they relate to each other in order to carry out all functions of each cell.
3. Know the microscopic organization of the organs that form apparatuses and systems of an animal organism.
4. Observe and identify cells, tissues and organs at a microscopic level in different histological preparations, recognise and describe the main structural singularities that define them.
5. Communicate their knowledge in a correct and effectively way.
6. Proper management of necessary means for the study of the subject.

Learning outcomes

If students complete the course successfully, they should be able to

1. Use correctly the basic terminology of Cytology, Histology and Microscopic Anatomy

2. Identify the structural and ultra-structural characteristics of cells.
3. Know the organelles functions and other cellular structures, relating them to each other and understand their necessary coordination for the cell to carry out its tasks.
4. Describe components and characteristics of the different tissues.
5. Know the disposition and microscopic organization of tissues to form the organs, apparatuses and systems of the animals, object of study of the veterinarian professional.
6. Acknowledge the meaning and fundamentals of basic histological sample preparation techniques
7. Recognize and differentiate the basic methods of microscopic staining and observation.
8. Use properly the optical microscope for observation of histological slices.
9. Recognize and differentiating cells, tissues and animal organs under the optical microscope, and how to describe them.
10. Obtain and correct use of bibliographic information related to the subject

Importance of learning outcomes

In Veterinary Medicine studies, It is necessary to know the animal organism for both health maintenance and disease treatments

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

The assessment of nº 1, 2, 3, 4, 5 and 10 learning goals will be carried out by 2 **theoretical examinations** (1st and 2nd partial).

Nº 1, 6, 7, 8, 9 and 10 learning goals will be assessed through **practical examinations .**

Minimum score to pass both exams is 50 points out of 100.

It will also be included the production of a **logbook** that compiles the work done in each practical session. It will be used to assess nº 1, 4, 5, 7, 8, 9 and 10 learning goals.

1. Theorical examinations

They are mainly based on short answer questions (1-point maximum) and multiple choice (0.5 point maximum).

Each partial exam must be **done individually** to pass the subject.

The sum of the score obtained from both theoretical exams will account for 60% of the final grade

In January / February the 1st theoretical partial exam will be carried out, that will permit to eliminate subject contents. Students who do not pass it will be able to present themselves again in the final evaluation. Students who pass this exam but fail to pass the subject in the first official call will receive the qualification of suspense, but they will keep the grade for the second official call.

2. Practical examinations

Two types of compulsory practical exams will take place:

2.1. Practical examination with images. Histological images will be projected to be identified by the student, this type of examination will take place twice a year and each of them will be marked from 0 to 10 points. Students who have not been able to take any of these exams during the academic year or who have not obtained the required minimum mark (10 out of 20 points), they will have to take it on the day of the final assessment.

There will be 2 types of mandatory practical exams:

2.1. Practical exam with images. It will consist of the projection of histological images that the student must identify. There will be 2 exams of this type during the course, the first coinciding with the first theoretical partial exam and the second in the month of May. Students who have not been able to take any of these exams during the school period or who have not obtained the minimum required grade (10 out of 20 points), must take a new practical exam with images on the day of the final exam. will include all those studied during the course. The score obtained will represent 20% of the final grade

2.2 Practical examination with microscope. In this exam, each student will receive 4 histological preparations that must be observed under the microscope, identifying the tissue or organ in question and making a brief histological description of them. Each preparation will be valued on 5 points. The minimum score necessary to pass this exam will be 10 points. The score obtained will represent 20% of the final grade.

Students who pass any of the 2 practical exams but fail to pass the subject in the first official call will receive the qualification of suspense, but they will save the grade for the second call and if necessary for the next course.

3. Logbook

The logbook must be submitted for evaluation at the end of the course. In the logbook it will be valued that it contains drawings and written indications of all the samples studied in the practices as well as the clarity and quality of its presentation and will be qualified as Apto / No Apto. The qualification obtained from the assessment of the logbook is an essential requirement to pass the subject. Students whose logbook is considered Non-Appropriate must take an additional practical exam in which they must graphically represent on paper the structures / organs required of them.

Examinations for non-attendance students or those who do not take them on first season

Non-attendance students will have to take a final assessment, which will consist of a theorical exam (which has 2 partial exams) and a practical one (images and microscopes). They will also have to undertake an additional practical exam instead of the logbook. In the latter, students will have to graphically represent on a paper the structures/organs required. The assessment criteria and the level of requirement for non-attendance students will be the same as for the rest of the students.

For students who appear in other calls different from the first, the evaluation, assessment criteria and level of demand will be the same as in the first call.

Examination Schedule

Dates and times of the first and second season final exams are publicly available on :

https://veterinaria.unizar.es/examenesvet

Dates for partial and practical exams will be released along the academic year.

Assessment criteria

To pass the subject it is necessary to obtain APTO qualification in the logbook and pass each of the exams separately (first theoretical partial, second theoretical partial, practical examination with microscope and practical examination with images).

The final mark is obtained by:

* The average of the theoretical exam marks (up to 60 points).

* Marks of practical exams (up to 40 points)

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that has been designed for this course is based on the following activities:

Lectures: The topics tackled in this course will be presented, explained and discussed in 50 minute lectures where ppt

presentations will be used for image support.

Seminars: At the beginning of course a seminar will be held where the Histological Technique will be explained. Students will also observe, comment and discuss electron microscopy images corresponding to the theoretical classes of Cytology.

Laboratory practice: Parallel to the theory small-group practical classes will be held, where the student will observe histological preparations of various tissues and organs using optical microscopes. Each student must take 16 practices, 1.5 or 2-hour duration, in the Histology laboratory. The existence of more than 3 unexcused absences from these classes implies that the student will go directly to practical final exam.

Works: Students have to complete a lab notebook which is considered mandatory.

Tutorials: Students will be able to meet teachers to consult issues related to the subject. Dates and times should be agreed by email in advance.

Selected supporting materials will be provided in the Moodle Digital Platform: https://moodle2.unizar.es/

Learning tasks

The program that is offered to the student to help him to achieve the expected results includes the following activities...

I) Lectures on the contents shown in the course syllabus.

II) Laboratory practical classes with the following contents:

1. Epithelial tissue (I)
2. Epithelial tissue (II)
3. Connective tissue
4. Cartilage and bone
5. Muscle tissue
6. Nervous system
7. Cardiovascular system
8. Endocrine system
9. Respiratory system
10. Digestive system (I)
11. Digestive system (II)
12. Lymphoid Organs
13. Urinary system
14. Reproductive system
15. Review (I)
16. Review (II)

In the review practices students will have at their disposal all histological preparations that have been used in previous practices along the course. The teacher responsible for the course will offer support and answers to the questions raised in the review.

Syllabus

Introduction

Unit 1. Cytology and Histology concept. Historical perspective. Spanish School of Histology. Histological methods: microscopy, electron microscopy, histochemistry, immunocytochemistry.

Cytology

Unit 2. Introduction to cell study. Cell Theory. General concepts: prokaryote and eukaryote cells. Observation of fixed and stained cells.

Unit 3. Plasma membrane: structural model and chemical composition. Properties and functions. Molecular transport. Endocytosis and exocytosis.

Unit 4. Ribosomes. Endoplasmic reticulum: ultrastructure and varieties: granular (rough) and agranular (smooth) endoplasmic reticulum. Functions.

Unit 5. The Golgi complex: ultrastructure. Functions. Cellular secretion. Unit 6. Lysosomes and peroxisomes: ultrastructure. Functions.

Unit 7. The mitochondria: ultrastructure. Functions.

Unit 8. The cytoskeleton: microtubules, microfilaments and intermediate filaments. Ultrastructure and organization. Functions. Cytoplasmic Inclusions. Hyaloplasma.

Unit 9. The nucleus: general characteristics: shape, number, position and general structure. Nuclear envelope. Nuclear pores. Chromatin. Nucleolus. Nucleoplasm.

General Histology

Unit 10. Animal Tissues: concept. Tissue differentiation and renovation. Tissue classification. Epithelial tissue. Structural and functional characteristics. Cellular polarity: apical, lateral and basal surfaces. Epithelial classification. Lining epithelia types. Glandular epithelia and glands. Epithelial cell renewal.

Unit 11. Connective tissue: structural and functional characteristics. Classification. Cells and extracellular components. Adipose tissue.

Unit 12. Cartilage: structure. Classification. Hyaline cartilage. Elastic cartilage. Fibrous cartilage. Origin and growth of cartilage.

Unit 13. Bone: general characteristics. Classification. General structure of bones. Cellular and matrix components of Unit 14. The blood: Study techniques. Erythrocytes, leukocytes, platelets. Morphological variations, structure and chemical composition. Differences in various animal species. The bone marrow. Hematopoiesis.

Unit 15. Muscle tissue: Types. Skeletal muscle. Types of muscle fibers. Muscle-tendon junctions. Cardiac muscle. Smooth muscle. Regeneration of muscle tissues.

Unit 16. Nervous tissue: general characteristics. Neurons: structure and ultrastructure. Classification of neurons. Nerve fiber: myelinated and unmyelinated nerve fibers. Degeneration and regeneration of nerve fibers. Interneuron synapses. Neuroglia.

Microscopic Anatomy

Unit 17. Nervous system: general organization. Central nervous system: the brain. Structure of isocortex. White matter. Cerebellum. Cellular organization of cerebellar cortex. White matter. Spinal cord: white and gray matter. Meninges. Ependyma. Choroid plexuses. Peripheral nervous system: peripheral nerves. Dorsal root ganglia.

Unit 18. The cardiovascular system: arteries. Arteriolar-venous anastomosis. Capillaries. Chemoreceptors and baroreceptors. Veins. Venous circulation and valves. The heart: cardiac skeleton. Cardiac valves. Lymphatic vessels.

Unit 19. Lymphoid organs: general characteristics. Primary lymphoid organs: the thymus and the bursa of Fabricius. Secondary lymphoid organs: lymph node, the spleen, hemolymph nodes.

Unit 20. The digestive system: the buccal cavity, tongue, teeth, lips and palate. The pharynx. The salivary glands. The digestive tube: general structure: the esophagus, the glandular stomach, the compound stomach, the small intestine, the large intestine. The Peritoneum. The liver and gallbladder. The exocrine pancreas. The avian digestive system.

Unit 21. The Respiratory system: components and structural organization: the nasal cavity, the larynx, the trachea, the lung, the pleura. The Avian respiratory system, and the air

Unit 22. The urinary system: the kidney. Differences among domestic species. General structure. The nephron. Collecting duct system. Juxtaglomerular complex. Blood supply of kidney. Lymphatic vessels. Renal pelvis. The ureters. The urinary bladder. The urethrae.

Unit 23. The Endocrine system: peripheral diffuse endocrine system. Hypophysis and epiphyisis cerebri. The thyroid, parathyroid and adrenal glands. The endocrine pancreas.

Unit 24. The male reproductive system: general characteristics. The testes: structure and functions. The epididymis. The ductus deferens. The Accessory glands: vesicular, prostate and bulbourethral glands. The penis.

Unit 25. The female reproductive system: the ovary, the oviduct, the uterus and the vagina. The avian reproductive system. The mammary gland.

Unit 26. The integumentary system: the skin: epidermis and dermis. Hair folicle. Hair structure.

Unit 27. The eye: structure of eyeball and eyelid. The ear: general structure.

Course planning and calendar

The timetable and schedule of lectures and practical classes can be found at:

https://veterinaria.unizar.es/horarios1vet

The composition of the groups for the practical classes will be published in the unit bulletin board at the beginning of the course.

On the website of the Faculty of Veterinary Medicine (https://veterinaria.unizar.es/academico/plan-estudios-grado-veterinaria) detailed information is offered about the different activities programmed for this course and the corresponding deadlines.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28400

Universidad Zaragoza

Year : 2018/19

28401 - Biology and Biochemistry

Syllabus Information

Academic Year: 2018/19
Subject: 28401 - Biology and Biochemistry
Faculty / School: 105 -
Degree: 451 - Degree in Veterinary Science
ECTS: 9.0
Year: 1
Semester: Annual
Subject Type: Basic Education
Module:

General information

Aims of the course

The ultimate aim of the subject Biology is to transfer to the students the knowledge and capacity of analysis related to this subject with the evolutionary process, the formation of populations and species, the implication of the plant world on production and the extent to which populations influenced by human performance change.

For its part, the general objective of the subject Biochemistry is to inculcate in the students the basic fundamentals of all the biological molecules that in later subjects will be applied for the study of pathologies and their treatment, nutrition, animal genetic improvement and breeding procedures applied to animal production, and breeding technologies, food preservation and processing.

Context and importance of this course in the degree

The subject of Biology constitutes the first part of the subject of Biology and Biochemistry framed within the basic subjects of the Veterinary Degree. It is the basis for the comprehension and comparison of all the aspects of living beings, with numerous practical applications of evolutionary biology in future working life of the Veterinarians.

The subject of Biochemistry forms part of the basic training module and is indispensable for the knowledge of the structure of biomolecules, metabolic reactions of their synthesis and transformation, obtaining energy as well as all regulatory mechanisms. Obtaining all of these basic principles is important for the knowledge of the growth and development of organisms. The degree is intended, among other things, to make available to the Administration and qualified technical companies for the direction of the departments of Health and Production Animal, Hygiene and Food Safety, as well as for clinical animal care.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

Transversal:

01. Realization of analysis and synthesis
02. Application of knowledge in practice
03. Time planning and management
04. Oral and written communication
05. Research skills
06. Ability to learn
07. Information management skills (ability to search for and analyse information from a variety of sources)
08. Critical and self-critical capacity

09. Ability to generate new ideas

10. Troubleshooting

11. Teamwork

12. Relationship capacity

14. Eagerness to overcome

Specific MATERIAL BIOLOGY:

01. Knowledge of the classification systems and nomenclature of organisms.

02. Knowledge of the evolutionary process and the origin of new species.

04. Knowledge of the basics of plant structure and physiology

05. Initiation of knowledge of the applications of plant biotechnology.

06. Ability to move in a Biology laboratory

07. Dexterity in the handling of basic biological techniques

Specific BIOCHEMICAL MATERIALS:

01. Knowledge of the structure of biomolecules

02.Identification of metabolic reactions of synthesis and transformation of biomolecules, as well as mechanisms of regulation.

03. Knowledge of the mechanisms for obtaining metabolic energy.

04. Initiation of the knowledge of the applications of Biochemistry.

05. Ability to move in a biochemical laboratory

06. Dexterity in the handling of basic biochemical techniques

Learning outcomes

If students complete the course successfully, they should be able to:

1. Identify and know the structure of biomolecules, metabolic transformation reactions and synthesis of these biomolecules, as well as regulatory mechanisms.
2. Describe the mechanisms for obtaining and transforming metabolic energy.
3. Able to explain how the set of inanimate molecules that make up living organisms influence each other to constitute, maintain and perpetuate life.
4. Manage himself in a Biology and Biochemistry laboratory and master basic tools and techniques for research as realization and staining of simple preparations for visualization by optical microscopy, obtaining samples of animal origin and quality analysis, calibration and use of automatic pipettes, spectrophotometry and calculations with biological repercussions.
5. Handle the most relevant sources of information.
6. Define and describe evolution as a process of genesis and change of living beings.
7. Analyze and enumerate the base of the mechanisms that allow to direct the animal and vegetal selection with application in the veterinary field.
8. Remember and understand the diversity of living beings, their classification and nomenclature.
9. Analyze and remember the relationships of organisms between them and with the environment.
10. Assess the contribution of the biology of plant systems to the veterinary agronomic environment.

Importance of learning outcomes

They allow the veterinary student to have an overview of the diversity of life and the metabolism of beings with the rest of the competences acquired in Chemistry and Physiology to the training of the students for its management in all the basic biological and biochemical aspects and that will have later application in the veterinarian profile.

They also contribute, along with the rest of the disciplinary modules, to the training of the students for the performance of the professional profiles of Teaching and Research in the fields related to Veterinary Science.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

1: Evaluation procedures and instruments in **BIOLOGY**

1. Evaluation of the knowledge acquired in relation to theoretical teaching, including that acquired in participative lectures, and seminars. It will be carried out by means of a multiple-choice written test with only one correct answer. Right answer is a positive point, wrong answer subtracts 0.2 points. The score of this test will be from 0 to 10, it will be necessary to get 50% of correct answers (5 out of 10) in each test and will represent 60% of the student's final grade in this subject. Passing these tests will accredit the achievement of learning outcomes 6 to 10.
2. The attendance to laboratory practices is compulsory. The evaluation of the knowledge acquired in relation to practice sessions will consist in the resolution of multiple choice test questions with a single right answer. Right answer is a positive point, wrong answer subtracts 0.2 points. The grade will be from 0 to 10, it will be necessary to obtain 50% of correct answers (5 out of 10) and will suppose 40% of the student's final grade in this course.

Passing this test will demonstrate achievement of the learning outcome 4.

2: Evaluation procedures and instruments in **BIOCHEMISTRY**

1. Partial and final written assessment test consisting of multiple choice questions with only one answer correct. Right answer is a positive point, wrong answer subtracts 0.2 points. The score of this test will be from 0 to 10, it will be necessary to obtain 50% of correct answers (5 out of 10) and will suppose 70% of the final grade of the student in this matter. Passing these tests will demonstrate the achievement of learning outcomes 1, 2 and 3.
2. Practical test of evaluation of the practices that have been carried out in the laboratory by means of the accomplishment of a laboratory practice. Passing this test will accredit the achievement of learning result 4. It will be passed when the required competence is carried out with the precision and accuracy proper to the procedure. The overall rating will involve 25% of the student's final grade in this subject. The attendance to laboratory practices is compulsory.
3. Assessment of information management capacity. Comprehension of selected scientific texts will be assessed. Written assessment test consisting of 10 multiple choice questions with only one correct answer. Right answer is a positive point, failure does not subtract points. Passing this test will accredit the achievement of learning outcome 5 and will be evaluated according to the following criteria and requirement levels. The score will be from 0 to 10, which will be added to the score of the theoretical exam once it has been passed, and will represent 5% of the final grade of the course.

Practice and/or theory may be approved independently (the grade may be saved for later season)

A part (practice or theory) will be compensated if the rating is 4.5 and if the other part is approved. In no case will grades lower than 5 be kept.

The final grade in this subject will be 66.6% of the grade of the subject "Biology and Biochemistry"

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning goals. A wide range of teaching and learning tasks are implemented, such as theory sessions, laboratory sessions, and seminars.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

Learning tasks

The course includes 9 ECTS organized according to:

- Biology teaching and learning activities (3 ECTS): 30 hours.
- Biochemistry teaching and learning activities (6 ECTS): 60 hours.

Biology teaching and learning activities:

- Lectures: 18 h.
- Animal handling sessions: 3 h
- Laboratory sessions: 7 h.
- Seminars: 2 h.
- Autonomous student work: 45 h study

Lecture notes will be available for the student (via Moodle) at least 1 week before their explanation in the classroom. At the beginning of each lecture, it is planned to spend 5 minutes reviewing the previous one in order to place students in the later explanation, and a 45 minutes exposure of the most important and/or difficult aspects. It will emphasize the need to interrupt the teacher when they see fit to solve problems as they arise during the lecture.

Animal handling session will take place on the premises of Support Service of Experimentation (SAE) and the sperm evaluation laboratories of the Department of Biochemistry and Molecular and Cellular Biology. In this practice session, the students will work in small groups (2 people from each classroom, to be announced in advance), and they will handle the rams during the semen collection by artificial vagina, and they will analyze the sperm quality in the laboratory in a 3-hour session.

Laboratory sessions will take place in a 3-hour session and two 2-hour sessions, in the laboratory of the Department of Biochemistry and Molecular and Cellular Biology.

Seminars will be organized in sessions of 1 hour and will consist of the visualization and discussion of a biology documental. They will be held on schedule of the lectures.

Biochemistry Teaching and learning activities:

- Lectures: 40 h.
- Seminars: 5 h.
- Laboratory practical sessions: 15 h.
- Autonomous student work: 65 h study

Lecture notes will be available for the student (via Moodle) at least 1 week before their explanation in the classroom. At the beginning of each lecture, it is planned to spend 5 minutes reviewing the previous one in order to place students in the later explanation, and a 45 minutes exposure of the most important and/or difficult aspects. It will emphasize the need to interrupt the teacher when they see fit to solve problems as they arise during the lecture.

Laboratory sessions will take place in 3-hour sessions in the laboratory of the Department of Biochemistry and Molecular and Cellular Biology.

Seminars will be organized in sessions of 1 hour and will consist on the resolution of biochemistry problems related to lecture sessions.

Syllabus

The course will address the following topics:

Biology

Block I: THE ORIGING OF LIFE AND THE BIOLOGICAL DIVERSITY

Unit 1.- Exploration and classification of life: Definition of Biology. Introduction to the study of biological diversity.

Classification of the diversity of life: classification and nomenclature systems. Unity in the diversity of life: the concept of evolution

Unit 2.- The origin and evolution of life: Life and living beings: ideas about the generation of life. Conditions on early Earth made the origin of life possible. The hypothetical sequence of primitive cells formation. Different energy strategies: heterotrophic vs. autotrophic. The evolution of prokaryotes and the oxygen revolution. Origin of the eukaryotic cells. Multicellularity evolved several times in eukaryotes.

Block II: THE PROCESS OF EVOLUTION

Unit 3.-Evolution: History and evidences of Darwin's theory: Historical overview: ideas against evolution andevolutionary ideas prior to Darwin. The construction of Darwin's theory: descent with modification and natural selection. Evidence of the evolutionary process: Biogeography, fossil record, homologies and direct observation. After Darwin: synthetic theory of evolution.

Unit 4.-The evolution of populations: Key Concepts: gene, allele and gene pool. Variability in a population:quantification, origin and maintenance. The Hardy- Weinberg equilibrium. Causes of changes in the genetic composition of a population: gene flow, genetic drift, non-random mating and natural selection.

Unit 5.-Formation of new species and macroevolution: The biological species concept: reproductive isolation. Exploration of the reproductive barriers. Modes of speciation: allopatric and sympatric speciation. Macroevolution: convergent and divergent evolution, adaptive radiations and extinctions. The pace of speciation: gradualism and punctuated equilibrium.

Unit 6.- Reconstructing and using phylogenies: Definition of phylogeny, phylogenetic tree and clade. How phylogenetic trees are constructed? Parsimony, information sources and molecular clocks. Phylogeny relationship with taxonomy.

-Unit 7.- Taxonomy and phylogeny of species of veterinary interest: The tree of life: Prokaryotes, and eukariotes. The Eukarya domain: Protist, plants, fungus and animals. The animal kingdom classification and phyla of veterinary interest: Invertebrates and vertebrates

Block III: PLANT BIOLOGY

Unit 8.- The origin of plants and plant diversity: Origin of the land plants: biochemical and morphological evidences. Adaptations to life on land**.** Definition of the plant kingdom**.** Plant diversity: plant phylogeny**.** Vascular plants: general characteristics. Seed plants: the evolutionary advantage of seeds. Characteristics and diversity of angiosperms. Agricultural significance.

Unit 9.- Plant structure and form: The plant organs: structure, types and function. The three tissue systems: Dermal, vascular and Ground. Plant cells: Fundamental differences with animal cells: cell wall, vacuoles and plastids. Some specific types of plant cells. Tissue organization in each organ.

Unit 10.-Transport in vascular plants: Transport of water and minerals: The roots absorb water and minerals from the soil. The role of root hairs and mycorrhizae. Ascend of water and minerals from the roots through the xylem. Regulation of transpiration. Transport of organic nutrients: translocation. Symbiosis with nitrogen-fixing bacteria.

Unit 11.- Reproduction in angiosperms: Sexual reproduction: Life cycle of angiosperms. Pollination and double fertilization. Asexual reproduction: mechanisms and application in agriculture.

Unit 12.-Plant growth and development: Stopping the growth of the embryo within the seed: dormancy. Resumption of growth of the embryo: Seed germination. Plant growth. Primary growth, apical meristems. Secondary growth, lateral meristem.

Unit 13. - Plant hormones: Definition of plant hormones. Major groups of plant hormones: auxins, cytokinins gibberellins, abscisic acid, ethylene, brassinosteroids and defense hormones. Plant hormones role in growth and development, responses to stimuli and defense against herbivores.

Practical lessons program

- Practice 1: Semen collection and evaluation of sperm quality
- Practice 2: Introduction to the optical microscope. Observation and comparison of animal and plant cells.
- Practice 3: Concentration and cell viability
- Practice 4: Observation of subcellular organelles: plastids. Study of osmotic phenomenon

BIOCHEMISTRY THEORICAL LESSONS PROGRAM:

BLOCK I.- PROTEINS AND ENZYMES.

Unit 1. **Proteins and peptides.** Composition, characteristics. Peptide bond structure. Protein functions.

Unit 2. **The structure of proteins**. Primary structure. Secondary structure: ??Helices. ß- sheet. Tertiary structure: Myoglobin. Quaternary structure: Hemoglobin. Oxygenation. Cooperative effects. Conformational changes. Oxygenation regulation. Regulation by CO2. Bohr effect. 2,3- bisphosfoglicerate effect. Hemoglobinopathies.

Unit 3. **Enzymes**. Concept and characteristics. Classification and nomenclature. Enzymes as catalysts. Isoenzymes.

Unit 4.**Active site of an enzyme.** Concept and general characteristics. Chymotrypsin mechanism action.

Unit 5. **Kinetics of enzymatic reactions**. Initial velocity, maximum velocity. Michaelis-Menten equation. Enzymatic activity. Experimental determination of Km and Vmax.

Unit 6. **Regulation of enzymatic activity**. By changes in gene expression. Changes in environmental conditions. Mechanism of enzyme inhibition. Covalent modifification mechanism. Allosteric regulation.

Unit 7. **Oxidation-Reduction cofactors**. Nicotinamide cofactors. Structure, function and mechanism of action. Flavin cofactors. Structure, function and mechanism of action.

Unit 8. Transfer cofactors. Structure and function. Tetrahydrofolate. Coenzyme B12. Pyridoxal Phosphate. Coenzyme A. Unit 9. **Carboxylation-Decarboxylation cofactors**. Structure and function. Biotin and Thiamine Pyrophosphate.

Unit 10. **Energy Metabolism.** Catabolism and Anabolism. Coupled reactions. ATP. Energy regulation. Cell energy level. The Phosphorylation Potential.

Unit 11. **Oxidative Phosphorylation**. Electron transport chain, oxidative phosphorylation. The Chemiosmotic Model. ATP Synthase.

PART II. - CARBOHYDRATE METABOLISM.

Unit 12. **Glycolysis**. Phases. Enzymatic steps. Regulation and energy balance. Incorporation of different monosaccharides Unit 13. **Destinations for pyruvate**. Fermentations. Entry of pyruvate into the mitochondria. Pyruvate Dehydrogenase

Complex. Recovery cytoplasmic NAD+ Shuttles.

Unit 14. **Krebs Cycle**. Enzymatic steps. Amphibolic Nature. Regulation. Glucose degradation energy efficiency.

Unit 15. **Pentose Phosphate Pathway**. Functions. Pathway phases. Enzymatic steps. Regulation as cellular needs. Glucose 6-phosphate Flow.

Unit 16. Carbohydrate Biosynthesis. Gluconeogenesis. Lactate to muscle glucose conversion. Cori Cycle. Gluconeogenesis from amino acids Krebs Cycle intermediates.

Unit 17. **Glycogen Metabolism.** Glycogen. Glycogen Synthesis. Glycogen Degradation. Glycogenolysis and Glycogenesis metabolic and hormonal regulation. Glycogenolysis and Glycogenesis signaling cascade amplification.

PART III. - LIPID METABOLISM.

Unit 18. Lipids. General properties, biological functions, and classification. Fatty acids: nature and properties. **Unit 19. Simple lipids.** Structures and physico-chemical properties of triacylglycerides and waxes.

Unit 20. Complex lipids. Structures and physico-chemical properties of glycerophospholipids and sphingolipids.

Unit 21. Unsaponifiables lipids. Structures, properties and biological functions of steroids (cholesterol, vitamin D, steroid hormones, bile acids).

Unit 22. Macromolecular structures of lipids. Composition. Bilayers (biological membranes) and monolayers (lipoproteins and lipid droplets) Formation. General properties and function of QM, VLDL, IDL, LDL and HDL.

Unit 23. Lipid metabolism. Oxidation of fatty acids. Types of adipose tissue. Neutral fat mobilization. Fatty acids activation and transport to the mitochondria. Saturated fatty acid β-oxidation. Beta;-oxidation energy balance. Regulation of fatty acid oxidation. Ketone body metabolism.

Unit 24. Fatty Acid Biosynthesis. Carbon sources and NADPH. Fatty acid synthase complex. Malonyl-ACP formation. Palmitate biosynthesis. Elongation and desaturation of fatty acid chains. Fatty acids biosynthesis regulation. Triacylglyceride biosynthesis.

Unit 25. Cholesterol biosynthesis. Cholesterol balance in the body. Intestinal absorption Cholesterol Biosynthesis. Regulation of cholesterol biosynthesis and uptake.

Unit 26. Eicosanoids biosynthesis. Arachidonic acid as a precursor of eicosanoids. Prostaglandins and thromboxanes biosynthesis via cyclo-oxygenase. Leukotrienes biosynthesis via lipoxygenase. Biological repercussions.

Unit 27. Metabolic coordination. Metabolic interactions between major metabolizing lipids organs. Fat digestion and absorption. Transport of endogenous and exogenous fat. Major hormones that control lipids metabolism in mammals.

PART IV. - AMINO ACIDS AND NITROGEN COMPOUNDS METABOLISM.

Unit 28. Degradation of Amino Acids I. General characteristics. The loss of amino acids group: transamination and oxidative deamination. Fate of ammonium ion: ammonium ion toxicity and transport from peripheral tissues to the liver. Muscle amino acids. Glucose-alanine cycle. Ammonium excretion. Urea cycle: stages, cellular location, energy balance and genetic defects.

Unit 29. **Degradation of Amino Acids II**. General characteristics. The loss of amino acids group: transamination and oxidative deamination. Fate of ammonium ion: ammonium ion toxicity and transport from peripheral tissues to the liver. Muscle amino acids. Glucose-alanine cycle. Ammonium excretion. Urea cycle: stages, cellular location, energy balance and genetic defects.

Unit 30: **The Biosynthesis of amino acids.** The Nitrogen cycle. Biological nitrogen fixation: organisms capable of performing it, enzymatic mechanisms and regulation. Essential and non-essential amino acids. Biosynthesis of nonessential amino acids.

Unit 31: **Precursor functions of amino acids.** Amino acids as precursors of biomolecules. Biosynthesis and degradation of porphyrins: main stages and genetic defects.

Unit 32: **Nucleotides Metabolism**. Nomenclature of nucleotides: purine and pyrimidine. Biosynthesis of purine nucleotides: main stages and regulation. Biosynthesis of pyrimidine nucleotides: main stages and regulation. Purine degradation: stages and genetic defects. Pyrimidine degradation.

Unit 33: **Amino acid metabolism regulation**: overview of amino acids metabolism in the liver. Hormonal regulation of amino acids metabolism: Insulin and Glucagon.

PRACTICAL LESSONS PROGRAM

1. Laboratory work introduction. Calibration of automatic pipettes.
2. Introduction to spectrophotometry. Quantitative determination of proteins.
3. Quantitative determination of plasma cholesterol.
4. Determination of Lactate Dehydrogenase (LDH) activity.
5. Skill verification of Competency: the student will individually carry out one of the four laboratory training topic and will present a detailed result report, using a scientific format.

Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course please refer to the FZ website (https://veterinaria.unizar.es/).

Bibliography

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28401

Universidad Zaragoza

Year : 2018/19

28402 - Ethnology and Animal Welfare

Syllabus Information

Academic Year: 2018/19
Subject: 28402 - Ethnology and Animal Welfare
Faculty / School: 105 -
Degree: 451 - Degree in Veterinary Science
ECTS: 9.0
Year: 1
Semester: Annual
Subject Type: Compulsory
Module: ---

General information

Aims of the course

The student, once passed this subject, should be able to:

Ethnology

1. Identify an animal's breed (within the main breeds or breed groups) and its suitability or usefulness.
2. Make a value judgment on productive or morphostructural information of any important animal breed, in the main domestic species.
3. Understand the lexicon that defines the breeds and its variation of phaneros, morphology and productivity.
4. Know the most important identification methods and make decisions about their usefulness in specific situations.
5. Present a subject work in an effective way and to be able to carry it out successfully.
6. Know the different basic aspects of the handling of animals.

Animal Welfare

1. To know and explain the animal welfare issues in Europe, integrating it in the context of an agro-ecosystem.
2. Be aware of the ethical commitment of the veterinarian in aspects related to animal welfare and its relationship with the human-animal link.
3. Understand the responsibility of the veterinarian in cases of animal violence in the context of the inter-specific family group and gender violence.
4. To know the definitions and concepts of animal welfare from an EU perspective.
5. To know the physiological bases of the adaptation syndrome (stress) of domestic animals, its biological cost and consequences for physical health and the emotional state.
6. To know the relationships between animal welfare an product quality, integrating animal welfare into a new quality concept within the agro-ecosystems.
7. To know the animal welfare evaluation systems, selecting accurate, valid and reliable animal welfare indicators.
8. To know the current legislation on animal welfare, its general foundations and its practical application in specific case studies.
9. To have a brief knowledge of the most intensive production systems, detecting their critical points for animal welfare and their alternatives systems, , proposing viable solutions for specific cases.
10. To know, in an introductory way, the normal behavior of the dog and the cat, as well as to those behavioral alterations that can be indicators of a loss of welfare status in these species.
11. To know and differentiate normal behavior from altered behavior in dogs and cats.
12. To recognize the critical points that may affect the welfare of pets, analyzing possible viable solutions.

Context and importance of this course in the degree

Ethnology

It provides students with the practical necessary knowledge to approach the study of other subjects of the Degree in Veterinary, both basic and specialized.

It is a first year subject on the first semester, therefore it is going to receive students that most probably have not had previous contact with the Veterinary Sciences in general and Zootechnics in particular. For this reason, this course will provide students the keys to begin to configure their professional character as veterinarians.

Learning about animal breeds is a good introduction to Animal Production and professional reality and the subject plays an essential role in the training of the future Veterinarian.

Animal Welfare

The Universal Declaration on Animal Welfare (UDAW) (http://www.udaw.org/about.htm) has been adopted by the European Union (EU), the World Organisation for Animal Health (OIE), the Federation of Veterinarian of Europe (FVE) and the European Association of Establishment for Veterinary Education (EAEVE), and establishes that this matter is a priority in the training of Veterinarians, as they will be responsible for both defining and enforcing the legislation and standards required in relation to animal welfare. For more information, please visit the following links:

http://ec.europa.eu/food/animal/welfare/index_es.htm

http://www.oie.int/doc/ged/D4079.PDF

http://www.eaeve.org/about-eaeve/mission-and-objectives.html

http://www.fve.org/about_fve/workinggroups.php

This is a scientific discipline that refers to a physiological state of physical and mental well-being of the animal in a given environment, and can be objectively assessed through physiological, ethological, production and product quality indicators, as well as through the evaluation of housing conditions and handling of animals. The definition of Animal Welfare is based on the so-called Five Freedoms for Animal Welfare first formulated by the Farm Animal Welfare Council (FAWC (http://www.fawc.org.uk/freedoms.htm). We define Animal Welfare as *a dynamic state in which animals adapt effectively in a given environment, overcoming challenges with a minimum biological cost, maintained in a state of complete physical and mental health, in harmony with its environment*. A complete list of definitions of Animal Welfare have been enunciated in our European Project LAYWEL whose website can be consulted at: http://www.laywel.eu/

Animal Welfare is, in addition to an ethical aspect of production, an added value of the product that should be valued and certified so that consumers assume a broader concept of quality that includes it in addition to the intrinsic quality of the products. Therefore, the new production systems should include the analysis and optimization of the animal welfare as a main component of the system, with a strong influence on the efficiency of the transformation processes.

The Veterinarians should know and understand the characteristics of the human animal-bond between our clients and their pets, in order to be able to advise properly and to assess the consequences of our recommendations may have on the welfare of the animal and its family.

Although the human-animal relationship is usually good, sometimes people can treat animals in a negligent, violent and even cruel manner. When these situations occur, the ethical and professional principles of the Veterinary Medicine indicate that veterinarians have a responsibility not only to the animals involved, but also to the Society as a whole. The majority of veterinarians recognize their important role in the detection and prevention of animal abuse. Veterinarians should be able to make a clinical diagnosis of animals suspected of mistreatment, cruelty, abuse, emaciation or signs of fighting. However, there is a general coincidence that there are no protocols for appropriate action for these cases that often transcend the animal abuse and sometimes happen to interpersonal and gender-based violence. There are numerous obstacles, in the first place, the little or no training received, as a result of the lack of attention paid to the Forensic Veterinary (www.ivfsa.org); secondly, the scarce legal guarantees that protect the Veterinarian when must report such suspicious cases, especially those in which family violence is suspected; and, thirdly, the absence of clear guidelines and protocols to follow in these cases of animal and/or family violence or abuse.

It is therefore very necessary to include in the Animal Welfare *curriculum* as a competency, and as a subject. Without any kind of attachments, since it is a clear, concise and universally accepted term in all statements about Animal Welfare. We are thus complying with the recommendations of the EU, OIE, FVE and EAEVE, in line with other modern and advanced programmes in Europe.

Recommendations to take this course

The basic requirements are those corresponding to the initiation of the Veterinary Degree. Basic knowledge of Biology, Anatomy, Mathematics, Biochemistry, Ethics and English are important to facilitate understanding. It also

requires the ability to work in groups and solve cases and problems that require the search for information.

Knowledge of computers and Internet use are also highly recommended.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

Ethnology

1. Identify the breed, its aptitude and the productive implications of the different domestic species.
2. Use in an appropriate way a veterinarian lexicon of habitual use.
3. Understand the complexity of animal identification and its possibilities.
4. Handling animals.

Animal Welfare

1. To interpret and explain the social problem of animal welfare in Europe, integrating it in the context of the agro-ecosystem.
2. To have an ethical perspective in relation to animal welfare issues and its relation to the human-animal bond.
3. To know the responsibility of the veterinarian in cases of animal violence in the context of the inter-specific family and gender violence.
4. To define animal welfare from a EU perspective, based on a holistic concept of animal welfare in relation to the five freedoms.
5. To know the physiological bases of the animal adaptation syndrome (stress), its biological cost and consequences for physical and mental health.
6. To know the relationship between animal welfare to product quality, integrating welfare into a new quality concept within the agro-ecosystem.
7. To c know the concept of animal welfare assessment systems, being able to select valid, reliable and viable animal welfare indicators. Understanding current animal welfare legislation, its general rationale and its practical application in specific cases.
8. To know briefly the most intensive production systems, detecting their critical risk points for animal welfare and proposing alternatives within the framework of a more demanding global market, in relation to the resolution of specific cases of risk to animal welfare.
9. To know and differentiate normal behavior from altered behavior in dogs and cats.
10. To recognize the critical points that may compromise animal welfare of pets and to suggest possible viable solutions.
11. To recognize the critical points on which to act to improve the welfare of non-domestic animals in captivity.

Learning outcomes

If students complete the course successfully, they should be able to:

Ethnology

- Identify the breed of an animal (within the main breeds or racial groups) and its suitability or utility.
- Make a value judgment on productive or morphostructural information of any kind.
- Make a value judgment on productive or morphostructural information of any important animal breed, in any domestic species.
- Understand the lexicon that defines the breeds and its variation of phaneros, morphology and productivity.
- Understand the need for animal identification and the usefulness of available methods.
- Know different basic aspects of animal management.

Animal Welfare

1. Assesses and critically evaluates the social problem of animal welfare in the EU in the context of an agro-ecosystem and other animals under human responsibility.
2. Explain and argues about the Veterinarian's ethical commitment to animal welfare issues in the context of European legislation.

3. Understand the human-animal link and the role of the veterinarian in the recognition and prevention of cases of animal and family violence.
4. Define animal welfare and describing the basic concepts related to animal welfare from a modern animal welfare perspective based on the five freedoms.
5. Describe the physiological basis of the adaptation syndrome (stress) of domestic animals, its biological cost and physical and mental health consequences and the emotional state.
6. Relate animal welfare to product quality by integrating welfare into a new concept of quality within of the production system.
7. Describe, in a generic way, the systems of evaluation of the animal welfare, being able to select valid, reliable and viable indicators of animal welfare.
8. Know the fundamentals of current animal welfare legislation and how to apply it in specific case studies.
9. Describe, in a generic way, the most intensive and risky production systems for animal welfare, indicating their critical points and proposing viable production alternatives or partial modifications to the existing ones, aimed at improving animal welfare and efficiency.
10. Assess and differentiate a normal behavior from an altered one in dogs and cats
11. Know the critical points on which to act to improve the welfare of companion animals in the context of the interspecific family group.
12. Recognize critical points for the welfare of non-domestic animals in captivity

Importance of learning outcomes

Ethnology

In addition to the learning and acquisition of competence previously indicated, the student will be able to have a better understanding and make the most of other subjects, both in the area of Clinical Sciences, in which he/she will learn something fundamental about who the patient is, as in the zootechnical subjects of Nutrition and Food, Genetics and especially in ALL the integration of fourth year.

Animal Welfare

The importance of the learning results obtained in the subject are deduced from the points and observations described in the section on context and meaning of the subject in the degree to which I refer for reading

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

Ethnology

The student will have to demonstrate that has reached the results of learning foreseen in the evaluation of the different competences:

In order to handle animals, their aptitude and disposition will be valued in the respective practical classes, the professor will value the ability demonstrated by the student to acquire the different management skills taught during the course. practical demonstration.

In order to handle animals, their aptitude and disposition will be valued in the respective practical classes, the professor will value the ability demonstrated by the student to acquire the different management skills taught during the practical demonstration.

In order to recognize the breed, its aptitude and the productive implications of the different domestic species, we will do the following corresponding theoretical (multiple-choice and developmental questions) and practical (breed differentiation by means of the audiovisuals). Each one of these aspects will be valued respectively with 6 and 2 points out of 10. In the theoretical part the student must obtain a grade equivalent to 5, in practice the equivalent to 6, in both parts the serious errors or racial identification will be penalized.

The appropriate use of an everyday veterinarian and famer lexicon and knowledge of the various identification methods, will be assessed by means of a theoretical examination with multiple-choice questions. Its valuation is included within the 4 points assigned to the theory, already indicated in the previous paragraph.

The 2 remaining points (2 out of 10) are acquired by the assessment of an individual practical work (1 point), and by the results of the continuous assessment (1 point). This continuous assessment includes the assessment of the practices, the results of evaluation exercises carried out in class and voluntary activities previously known by the

teacher and which, in no case, will suppose an imbalance in the student's POD.

Animal Welfare

The student must demonstrate that he has achieved the learning outcomes foreseen in the activities and evaluation **detailed in Table 1. The evaluation will be as detailed below:**

Theoretical examination (60%): consisting of a multiple choice test, with 4 options per question (with only one right answer) and applying a random correction coefficient of 25%. The maximum score of this test is 6 points and it is passed with a score equal to or higher than 3 (50%).

Assignment assessment (40%): Six case studies. Student´s own study based on real cases of animal welfare on topics presented in class, the student will receive the case, solve it and then attend a class of 1 hour with the responsible teacher of the case study for the final resolution. Total for all cases 1 point (0.166 each).

Field homework about a current Animal Welfare issue based in the City of Zaragoza. Animal welfare surveys in groups of 3-4 people. To carry out the surveys, elaborate the data with a computer application and to elaborate a corresponding report. A poster will be prepared with all the course data and will be publicly exhibited in the Faculty. Work done throughout the course in groups of 3-4 students (1.5 points).

Total grade for homeworks: 4 points. They will only be added to the final mark for animal welfare when 50% of the mark is obtained from the theory exam.

On-farm animal welfare (laying hens) assessment practices: On-site assessment at the end of the practice and compulsory attendance.

Dog training practice: On-site evaluation at the end of the practice and compulsory attendance.

Classroom Practice: recording and analysis of animal behavior based on video recording form our experiments with domestic animals (assistance and practice notebook).

Seminar by invitation on a current topic in Animal Welfare (proposed by the students): attendance and debate.

Final mark for animal welfare = theoretical examination (60%) + papers (40%).

Example: a student who obtains a 4 in the theoretical examination (out of 6) and a 2 for works (out of 4), will have a final grade (in animal welfare part) of 6 (out of 10).

Valuation criteria and requirement levels

Finally, in order to pass the theoretical exam, it is required to obtain 50% of the possible points, 60% in the practical one, as previously specified.

The final grade of this subject is obtained by averaging the grade obtained in Ethnology and Animal Welfare. This final grade will be obtained once the two parts of the subject have been passed.

The subject is passed with a grade equal to or higher than 5 out of 10. The qualitative grade will respond to the following criteria established in the exam regulations of the University of Zaragoza.

Note: If a student passes only one of the parts (Ethnology or Animal Welfare), the grade will be kept in the Unit's database until the student passes the other part of the course.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

5.1. Presentation of the global methodology

Ethnology

The learning process of this subject is based in all the next activities:

Theory. The program indicated for the subject will be developed in this activity, see point 5.3. This program will be previously known by the students with respect to the annual program and with respect to a guide book. All this will be complemented with other resources as CDs, typed sheets and triptychs.

Practice. Breed diagnosis, these lessons will be related with breed differentiation in the most important domestic species. Many of them will be prepared by the own students, always helped by the teachers of the subject.

Practice in classroom. About reproductive and productive problems.

Practice. Personal work about any theme related with the Ethnology: any breed, variety, breed group, and also about morphological aspects, social opinions and/or utility.

Practice. Management of 3 different species. In this on-farm lectures, the main morphological aspects and identification systems for each species will also be showed.

Animal fair.

Personal and continuous evaluation. This evaluation will be related with all the points related across the academic period. For example, of that, small tests will be performed, they will be run in the own classroom, with evaluation at the moment and with a positive note for all the students with excellent results.

Animal Welfare

The learning group in this part of the course will use the following teaching resources:

- Lectures in the classroom (manual of the classes will be provided and ppt presentation)
- Practices in the video room with digital video of our animal welfare experiments.
- Practices with animals in the experimental farm (welfare assessment in commercial laying hens)
- Two field studies in groups of 3-4 students. Data collection, data analysis, field report presentation.
- Case studies (homework) and resolution in classroom with the instructor (mainly focused in animal welfare legislation application to real cases).
- Tutorials in lab/office (mainly related to the design and realization of the field works)
- Seminar and debate with invited speaker (expert of some animal welfare hot topics).
- Course frame in the Digital Platform of the University *Moddle2* (all material and student's communication will be conducted in this digital platform).
- Theory evaluation (multiple choice-test) at the end of the course (weight 60%).
- Evaluation of home works, case studies and field work reports (weight 40%).
- Tutorials by e-mail with the instructor.
- Availability at the beginning of the Course Manual "*Animal Welfare"*? (114 pp.), prepared by the responsible teacher, including all the material explained in the course in class, actualized every year with the most recent material related to animal welfare topics in EU. The manual contain all the recommended literature used in the elaboration of the manual. This manual will be mainly useful for those students with difficulties to attend the theory classes, complemented with tutorial by e-mail or in the lab/office.
- Availability at the beginning of the course of the PDF version of the Power Point presentations of the Instructors (in the digital platform).
- Availability of all case studies to be solved by the student in hard copy and pdf, before the case resolution in class with the instructors.
- At the end of the course and after exams, students will be able to evaluate the course and the instructors. This evaluation will be realized using the digital platform of the University (ATENEA).

Learning tasks

Ethnology

The program offered to help the student to get the results includes the next programmed activities:

-Theory in classroom.

-Practical lesson in classroom.

-Practical lessons on-farm.

-Personal work.

Animal Welfare

All classes and activities will be programmed at the beginning of the course (Animal Welfare Course will start in early February -spring term-). Please, see groups and calendars in the web site of the Faculty of Veterinary Medicine, and

check periodically for possible small changes during the course. http://wzar.unizar.es/servicios/calendario

Syllabus

Ethnology

Activities	Theory Hours	Practice hours	Group Size
Introduction			
Introduction to the subject and main definitions	1		
Systematic of the breed classifications. Baron	1		-
Physiology-related productive indexes (reproductive, farm and productive)	4		-
Productive and reproductive problems		1	24
Work related to Ethnology. Half an hour about methodology aspects and half an hour of individual attention		1	75 and individually
Identification in livestock species (natural, technified and artificial).	2		
Identification in livestock species			
MANAGEMENT AND REGIONAL PECULIARITIES			
Small animals		1	6
Equine		1	6
Poultry		1	6
VISIT TO LIVESTOCK FAIR			
Multi-sectorial, where possible combined with livestock farming and animal park		1	2 groups
BREED DIFFERENTIATION			
Equine species. (Introduction, large breeds, other breeds, hybrid donkeys).	2		
Bovine species. (Introduction to the species, world breeds by aptitudes, Spanish breeds).	4		
Key racial differentiation in bovines.		1	24
Sheep species. (Introduction, world breeds by racial types, Spanish breeds).	4		
Key racial differentiation in sheep		1	24
Goat species. (Introduction to the species, world breeds by aptitudes, Spanish breeds).	2		
Key racial differentiation in goat		1	24
Porcine species. (Introduction, hybridization, world breeds, Spanish breeds).	2		
Key racial differentiation in pigs		1	24
Rabbits. (Introduction, racial classification).	1		
Key racial differentiation in rabbits.		1	24
Poultry: (Introduction, racial classification within the main species).	1		
Key racial differentiation in poultry		1	24
Cage birds. (Introduction and classification of the main species).	1		
Canine species. (Introduction: Basic Aspects).	2		
Key differentiation of racial groups in dogs.		2	48
Feline species (Introduction and main breeds)	1		
Key racial differentiation cats.		1	24
TOTAL	**28**	**17**	

Animal Welfare

	TOPIC
I	**Animal Welfare: Concepts and assessment**
I.1	Animal welfare in the context of the agro-ecosystem
I.2	Ethics and Animal Welfare. Lines of thought.
I.3	The human-animal bond. Importance of anamnesis and Veterinary advice.
I.4	Animal violence and mistreatment. Role of the Veterinarian.
I.5	Animal Welfare and the Food Market
I.6	Ethology and Animal Welfare
I.7	The consequence of stabling in animals
I.8	Relationship between production and animal welfare
I.9	Genetic selection for productivity and animal welfare
II	**Animal Welfare: adaptive response and definition**
II.1	Biological cost of adaptation
II.2	Definitions of Animal Welfare
III	**Animal Welfare Assessment**
III.1	Multi-criteria approach
III.2	Levels of action
III.3	Animal welfare indicator groups: Stress sensitivity thresholds
III.4	The EU assessment of animal welfare: The Welfare Quality® System
III.5	Animal Welfare as a production aim
III.6	Categorization of Production Systems
IV	**Aspects common to all systems**
IV.1	Transport and Animal Welfare
IV.2	Transport as moving housing
IV.3	The regulation of animal transport in the EU
IV.4	Critical points in the transport of animals. Temperature and air quality.
IV.5	The natural livestock handling by Temple Grandin
IV.6	Strategies for natural livestock Handling
IV.7	The role of senses during livestock handling
IV.8	Factors Affecting Transport Stress
V	**Concepts offear reaction (fearfulness)**
V.1	Definition of fear and terminology
V.2	Fear Measurement
V.3	Determining factors of fear
VI	**Concept of pain**
VI.1	Definition of the pain
VI.2	Measuring Painful Behavior
VII	**Concepts of suffering**
VII.1	Definition of suffering
VII.2	Sensory and cognitive abilities. Implications
VII.3	Recognition and Valuation of Suffering
VIII	**Stress response and meat quality**
VIII.1	Consequences of pre-sacrifice handling
VIII.2	Effect of stress on meat quality
VIII.3	Post-mortem metabolic changes
VIII.4	Stress Defects of Meat
IX	**Slaughter procedure**
IX.1	The salughterprocess
IX.2	Ante-mortem inspection
IX.3	Stunning and slaughter
IX.4	Stunning and Slaughter Control Systems by EU Regulation
IX.5	The new figure of the animal welfare officer at slaughterhouses.
X	**Description of some intensive production systems: critical points for animal welfare(AW)*.**
X.1	The egg production system: battery laying hens and alternatives to cages (floor systems)
X.2	The intensive broiler chicken meat production system
X.3	The intensive pig meat production system

X.4	The intensive dairy cattle production system
X.5	The intensive beef production system (feed-lot)
X.6	The intensive system of sheep meat production (lamb feed lot in Aragon Region)
XI	**Livestock and greenhouse gas emissions (GGELS). Relationship with AW**
XII	**Applied canine and feline ethology**
	Aspects of animal welfare in pets
	Animal welfare aspects of captive non-domestic animals (Zoo and similar)
	* The systems are briefly described with special emphasis on the most critical aspects for AW. For reasons of time we prioritize the most intensive systems, especially those that have been the subject of specific legislation. Depending on availability, we will also try to deal with systems such as aquaculture or rabbit production, which in the near future will be the subject of specific BA legislation.

Course planning and calendar

Ethnology

The time table of the Ethnology will be adapted to the academic calendar. Each student will receive a total of 28 hours of theory and 17 hours of practical lessons. These last include: 4 hours of animal management, 2 hour of identification methods, 9 hours of breed differentiation (see program), 1 hour of solving productive and reproductive problems and 1 hour for preparing the index and methodology of the personal work.

This personal work will be presented just befoe Christmas time and will be evaluated during January. In any case some voluntary sessions of personal auto-evaluation will be performed.

For a more detailed calendar see: http://wzar.unizar.es/servicios/calendario

Animal Welfare

Summary table for the results and methodology used in the animal welfare part (spring term)			
The academic calendar offer a total of 27 lecture hours (theory) and 18 othe type of lecture hours (practices in lab/hospital, practices in farm, field studies, case studies and seminars).			
Results	Methodology	Credits	Evaluation
1. To understand and explain the animal welfare issues in the EU, in the context of the agro-ecosystem and all animals under the care of humans.	Lectures and manual Documents on digital platform Field surveys Reports and posters	0.25	Exam Field work Case studies
2. To know and explain the ethical compromise of the Vet Professionals in relation to the animal welfare issues in EU. To know and understand the importance of the human animal bond and to detect cases of animal violence and abuse.	Lectures and manual Survey, reports Document available on digital platform	0.25	Exam Case studies
3. To know the animal welfare definition according to the new EU concept based on the five freedoms.	Lectures and manual Documents available in digital platform	0.75	Exam
4. To know the physiological base of the stress response in domestic and other captive animals.	Lectures and manual Documents available in digital platform	0.40	Exam
5. To understand the relationship between animal welfare and product quality (including the ethical value of the product).	Lectures and manual Case studies Documents available in digital platform	0.20	Exam Case studies Home work
6. To know the animal welfare assessment methods and the animal welfare indicators in function of its validity, feasibility and viability.	Lectures Practices in farm Case studies Documents available in digital platform	0.20	Exam Practice farm Cases studies Home work
7. To know the animal welfare legislation and to use this legislation in case studies	Case studies Documents available in digital platform	0.50	Cases studies Home work
8. To know the main intensive animal production systems (overview), with a critical perspective in relation to the animal welfare risks, proposing possible solutions in the context of the new food markets.	Lectures Case studies Documents available in digital platform	1.00	Exam Case studies Home-work Practice at the farm
9. To evaluate and distinguish the normal and abnormal behaviours in dog and cats.	Lectures Practices in lab	0.50	Exam Practice in hospital
10. To recognize the critical points for animal welfare in companion animals.	Lectures	0.25	Exam
11. To recognize the critical points for animal welfare in no-domestic captive animals (Zoo-type)	Lectures Seminar	0.20	Exam
Animal Welfare		4.5	Exam 60% Others 40%

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28402

Literature for animal welfare is available in the Manual "Animal Welfare" available at the beginning of the course

-Appleby C., Hughes B. 1997. Animal Welfare. CABI.

-Appleby M.C., Hughes B.O., Elson H.A. 1992. Poultry Production Systems. Behaviour n Management and Welfare. CAB UK

-Appleby, M.C. et al. 2008. Long distance transport and welfare of farm animals. CABI UK

-Blasco, A. 2011. Etica y Bienstar Animal. Akali/Ciencia.128 pp. Valencia Spain.

-Cooper J.E. and Cooper M.E. 2007. Veterinary and Compartive Forensic Medicine. Blackwell Pub. UK

-Ewing S.A., Lay D.C., Borell E. v. 1999. Farm animal well-being. Stress Physiology Animal Behaviour and Environmental Design. Prentice Hall USA

-Fraser A.F., Broom D.M. 2007. Farm Animal Behaviour & Welfare. CABI. 4th edition. Oxon UK

-Fraser D. 2008. Understanding animal welfare. The Science in its Cultural Context. Wiley Balckwell UK.

-Faucitano, L. And Schaefer, A.L. 2008. Welfare of Pigs. From birth to slaughter. Wageningen Academic Pub. The Netherlands.

-Grandin T., 2007. Livestock Handling and Transport. 3rd Edition, CABI UK

-Grandin T. 2010. Improving animal welfare. A practical Approach. CABI UK

-Gregory N.G. 1998. Animal Welfare & Meat Quality. CABI UK

-Gregory N.G.2004. Physiology and behaviour of animal suffering. Blackwell Pub. UFAW UK

-Haccou P., Meelis E., 1992. Statistical analysis of behaviour data. Oxford University Press. UK

-Hemsworth P.H. and Coleman G.J. 2011. Human-livestock interactions. 2nd Edition. CABI UK

-Keeling L.J., Gonyou H.W. 2001. Social Behaviour in Farm Animal. CABI UK

-Lehner P.N.1996. Handbook of Ethological Methods. Cambridge University Press. UK

-Mc Millan2005. Mental Health and Well-Being in Animals. Blackwell Publishing UK

-Meijboom L.B., Stassen E.N. 2016. The end of animal life: a start for ethical debate. Ethical and social considerations on killing animals. Wageningen Academic Publishers. The Netherlands.

-Moberg G.P., Mench J.A. 2000. The biology of animal stress. Basic principles and implications for animal welfare. CABI UK

-Mason G. Rushen J. 2006. Stereotypic Animal Behaviour. Fundamentals and applicationes to welfare. CABI

-Perry G.C. 2004. Welfare of the Laying Hen. CABI UK.

-Regan T. 2001. Defending Animal Rights. University of Illinois Press. Urbana and Chicago USA

Ricard M. 2014. En defensa de los animales. Ed. KairosBarcelona.

-Sandøe, P., Corr S., Palmer C. 2016. Companion animal ethics. Ufaw Animal Welfare Series. Wiley Blackwell, Oxford, UK

-Smulders F.J.M. and Algers B. 2009. Food safety assurance and veterinary publica health. Volume 5. Welfare of production animals:assessment and management of risks. Wageningen Academic Prub. The Netherlands.

-Webster J. 2005. Animal Welfare Limping Toward Eden. Blackwell Publishing. UK

-Weeks C.A., Butterworth A. 2004. Measuring and auditing broiler welfare. CABI. UK

-Webster J. 2005. Animal Welfare Limping Toward Eden. Blackwell Publishing. UK

Universidad Zaragoza

Year : 2018/19

28403 - Epidemiology and biostatistics

Syllabus Information

Academic Year: 2018/19

Subject: 28403 - Epidemiology and biostatistics

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 1

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The exposition in this subject departs from the situation of need that is created before a scientific study of realizing a correct epidemiologic and statistical data analysis. The better and the more rigorous is the epidemiologic and statistical study that we realize, the greater quality of the research work will be

The general aim therefore is, from the experimental results and the formulation of a hypothesis, to be able of obtaining the scientific thesis endorsed by a correct epidemiologic and statistical study.

Context and importance of this course in the degree

The subject Epidemiology and Biostatistics is a compulsory and it is integrated by two subjects given by academic staff from two different areas: Epidemiology (Area of Animal Health) and Biostatistics (Area of Applied Mathematics). Also this subject presents the peculiarity which both subjects belong to different modules inside the Degree in Veterinary Science: Epidemiology (Clinical Sciences and Animal Health) and Biostatistics (Common Basic training). It has a teaching load of 6 ECTS (4 Epidemiology and 2 Biostatistics) and has annual character, being given during the first course of the Degree.

The contents of these two subjects are the base for a correct use of the scientific method in the context of the veterinary sciences, as well as to allow a suitable knowledge of the animal populations and diseases that affect them. In case of the subject Biostatistics, the competences defined as the Order ECI/333/2008 as Biometrics and statistics applied to the veterinary sciences and Dynamics and demography of the infection and the poisoning are specially developed, while in Epidemiology the competences are: Transmission and maintenance of the diseases and methods of study of the diseases in populations, Diagnosis Epidemiology and diagnosis, System of pursuit and alertness, The investigation of outbreaks of food toxi-infections and Dynamics and demography of the infection and the poisoning.

Due to the basic character of this subject, its overcoming must qualify the students for the pursuit of the rest of specific subjects of the qualifications.

Recommendations to take this course

It is advisable to have studied subjects of Mathematics and Statistics prior entering the veterinary degree, as well as a few basic computer skills.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Make use of a scientific reasoning, with critical character, in the analysis, synthesis and evaluation of epidemiologic models and real statisticians.

2. Apply the knowledge acquired to the analysis and search of the model that better represents a set of experimental information, and to confirm properly the above mentioned solutions.

3. Use the computer applications relative to the ambience of study.

4. Use Internet as an information source, as well as mass communication media.

5. To dominate the aspects of the communication, both oral and written.

6. To show capacity of organization and autonomous planning of the work.

7. To apply appropriately the probability distributions to the different situations observed in Veterinary Sciences.

8. To understand the mechanisms of transmission and maintenance of the disease / infection in the animal populations.

9. To design, to carry out and to analyze epidemiological studies, including sampling, measurement of disease and detection of risk factors.

Learning outcomes

If students complete the course successfully, they should be able to:

Biostatistics

1. To describe from the statistics a set of experimental information.
2. To recognize the most habitual probability distributions in biomedical sciences.
3. To identify the probabilistic model that better fits to a set of experimental information.
4. To obtain conclusions on the statistical parameters of a population from a sample.
5. To analyze the possible regression models between two quantitative variables.
6. To use an appropriate computer hardware for solving the problems that arise in the previous paragraphs.

Epidemiology

1. To comprise the basic elements of the qualitative epidemiology and the relations among pathogenic, host, environment and disease
2. To interpret appropriately the results of a diagnostic test in reliability terms.
3. To design and to collect samples adapted to the target of the study
4. To characterize the health status of a population
5. To identify and to assess the possible risk factors that determine the health status of an individual from a population.
6. To understand the factors that they affect to the decision making and it is capable of taking decisions of rational and objective form.

Importance of learning outcomes

These learning outcomes are keys to qualify students for a solid base that allows them to face the rest specific modules of the degree in the best conditions, and this way to shape successfully its professional profile.

Also, with laboratorial sessions, the strengthening of the generic or cross-sectional competences that they contribute to its integral formation like postgraduates, especially the work in team and the use of computer hardware are encouraged.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student will have to demonstrate that has reached the results of learning foreseen by means of the following activities of evaluation

1. Assessment of **theoretical knowledge** and its application to a real context: It is based on the resolution of different activities on the teaching platform of the subject (multiple answers, mails, problems). First of all, key activities that cannot be assessed whose correct resolution is necessary to keep on gaining access to the activities (included theoretical documents) are included. The assessable activities are specific for every student and they are distributed in 20 topics with different individual weighting as its relevance, whose entire sum is proportional to the number of ECTS of every subject, so that in the final qualification the Biostatistics activities are 10% of the final qualification and the Epidemiology activities are 20% of the final qualification.

2. Assessment of problem solving in practical sessions: They are distributed in 10 sessions with different individual weighting as its relevancy, whose entire sum is proportional to the number of ECTS of every subject, therefore the Biostatistics activities are 6.7% and the Epidemiology activities are 13.3% of the final qualification.
3. Epidemiological study: It is a study based on the securing of samples of a (virtual) porcine development that provides information of quantitative and qualitative variables that will be analyzed in an integrated way from the epidemiologic and statistical point of view applying the methods and skills learned previously. This activity is carried out in the second half of the second semester supported by two practice sessions and it means 20% of the final qualification.
4. Written tests: Two partial examinations will be carried out corresponding to each subject. The ***first partial examination*** covers Biostatistic topics, there are 10 multiple choice questions and one essay-type questions and they both are 16.7% of the final qualification The ***second partial examination*** covers epidemiology topics, there are 20 multiple choice questions and 4 essay-type questions, and they both are 33.3% of final qualification.

In case of wrong answers, the score of the multiple choice questions will be reduced by means of dividing 1 by the number of wrong answers. It will be necessary to obtain at least 50% of the maximum qualification in every examination. Essay type questions assess the ability to solve problems reasonably and the proper application of the basic theoretical concepts in the context of the raised problems.

Also there will be valued the participation in different voluntary activities that will be realized along course, face-to-face as non-presential. This score increment will suppose an additional maximum of 5% to the final score.

Scores corresponding to activities 1, 2 and 3 will be kept for next courses.

In order to sum the raised continued evaluation up the following table is included:

Activity	Matter	Weighting	
1. Evaluation of theoretical knowledge and its application to a real context	Epi	14.6%	21.8%
	BS	7.2%	
2. Evaluation of the problem solving in the practical meetings	Epi	8.4%	13.2%
	BS	4.8%	
3. Epidemiological study	-	15.0%	15.0%
4. Written test	Epi	33.3%*	50.0%
	BS	16.7%*	
5. Voluntary activities		5.0%**	5.0%**
Total		**100%**	**100%**

* It is necessary to obtain 45% of the maximum score.

** It is a question of the maximum additional punctuation for participation in voluntary activities.

Criteria for evaluation and levels of demand

First of all, it is necessary to bear in mind that the subject is divided in two subjects of knowledge (Epidemiology and Biostatistics), which as we will see, have its coordinated and integrated learning activities. Nevertheless, on having talked each other of subjects belonging to different modules, it is necessary to guarantee a required minimums in each subject.

The result of the global sum of the qualifications of activities of assessment will have to be equal or superior to 5, but also, as it has been indicated in the previous paragraph, in the written test of both subjects should have to obtain a minimal punctuation of 45% of the maximum possible qualification in order to average with rest of the activities.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4.9: FAIL.

5.0-6.9: PASS

7.0-8.9: GOOD (NT).

9.0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Annex I: Distribution of theoretical topics for matter and relative weighting

Order	Subject	Weighting
Epi1	Type of variables and scales of measurement	0.53%
Epi2	Introduction to the Epidemiology	1.05%
Epi3	Assessment of diagnostic tests	1.58%
Epi4	Sampling	0.58%
Epi5	Qualitative Epidemiology	3.05%
Epi6	Causality	0,53%
Epi7	Epidemiologic surveys	1.05%
Epi8	Design of epidemiological studies	1.05%
Epi9	Cross-sectional observational studies	1.05%
Epi10	Longitudinal observational studis	1,05%
Epi11	Risk estimation	1.05%
Epi12	Theory of decision	1.05%
BS1	Probability Distributions	1.20%
BS2	Conditional Probability	0.60%
BS3	Frequencies	0.60%
BS4	Descriptive Statistics	0.60%
BS5	Statistical inference I: confidence intervals	0.60%
BS6	Statistical inference II: hypothesis contrast	1.20%
BS7	Statistical inference III: selection of tests of statistical contrast	0.60%
BS8	Models of interrelation and retrogression	0.60%
BS_prob	Problems of probability	0.60%
BS_inf	Problems of statistical inference	0.60%

Annex II: Distribution of practical meetings for matter and relative weighting

Practice	Weighting
Epi1: Diagnostic tests	1.58%
Epi2: Calculation of sample size	1.58%
Epi3: Stratified results	1.05%
Epi4: Cross-sectional disease measurements	1.05%
Epi5: Longitudinal disease measurements	1.58%
Epi6: Risk estimation	1.58%
BS1: Probability distributions	1.20%
BS2: Descriptive statistics	1.20%
BS3: Introduction to the Statistical inference	1.20%
BS4: Interrelation analysis. Simple Linear retrogression	1.20%

Matter	Theory	Practice	Total
Epidemiology	14.6%	8.4%	23.0%
Biostatistics	7.2%	4.8%	12.0%
Total	**21.8%**	**13.2%**	**35.0%**

Methodology, learning tasks, syllabus and resources

Methodological overview

The subject is structured in two matters blocks: Epidemiology, and Biostatistics. The lectures (teaching method) comprise 24 h of Epidemiology and 12 h of Biostatistics. The practical classes, which are given in meetings in computer classroom, comprise 12 h of Epidemiology; and 8 hours of Biostatistics.

For the lectures (teaching method), the pupils have previous access, across the teaching platform corresponding to the lesson that goes to work. So that it is important that they take the lesson read to assimilate better the class. The practical meetings will be carried out in classroom of computer science. The student must realize the steps following a script that will provide him to itself for every practice. Previously, the teacher has explained with an example each of the above mentioned steps.

Learning tasks

THEORETICAL TOPICS OF EPIDEMIOLOGY

Topic Epi1: Types of variables and scales of measurement

Descriptors: Quantitative and qualitative variables. Discrete and Continuous. Suitable measurements.

Competences: To be able to recognize the basic types of variables in a set of experimental information, as well as its possible measurement scales.

Teaching-learning activities:

- Lectures (teaching method): 1 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 1,5 h

Topic Epi2: Introduction to the Epidemiology

Descriptors: Historical precedents of the Epidemiology. Definition of Epidemiology. Uses of the Epidemiology. Differences between clinical medicine and epidemiology. Types of epidemiology. Examples of diseases.

Competences: To place to the Epidemiology in the frame of its historical evolution. To understand the Epidemiology concept. To know the targets of the Epidemiology. To be able to apply the epidemiologic method. To distinguish between Clinical medicine and Epidemiology.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi3: Assessment of diagnostic tests

Descriptors: Assessment of diagnostic tests: sensitivity, specificity and predictive values. Criteria for selection of diagnostic tests. Combination of diagnostic tests. Optimization of a diagnostic test. Agreement of two diagnostic tests (kappa).

Competences: To be capable of assessing the quality of a diagnostic test. To have objective criteria to select the diagnosis most adapted to every situation. To be capable of modifying the quality of a diagnostic test. To be capable of comparing two diagnostic tests.

Teaching-learning activities:

- Lectures (teaching method): 3 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 4,5 h

Topic Epi4: Sampling

Descriptors: Basic sampling concepts. Characteristics of the sample. Factors to be considered: sampling method and sample size. Types of errors (systematical and random). Mechanisms of production of biases and errors. Sampling methods: probabilistic and non probabilistic. Factors that influence the sample size. Adjustments of the sample size. Calculation of sample size (to detect disease/infection, to estimate an average, to estimate a percentage and to detect differences between percentages).

Competences: To know the theoretical essentials of the sampling. To be capable of selecting the most suitable sampling method. To be capable of applying the formulae of calculation of sample size.

Teaching-learning activities:

- Lectures (teaching method): 3 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 4,5 h

Topic Epi5: Elements of Qualitative Epidemiology

Descriptors: Temporary evolution of the disease in an individual (latency period, prepatency period and incubation period). Evolution of the disease in a population (epidemic curves, Kendall's threshold theorem, Law of Charles-Nicole, presentation spatial- time of the disease and Epidemic Index). Determinants of disease (agent, host and environment). Transmission of the disease (infection sources, transmission mechanisms, routes of transmission and strategies of maintenance of the infection).

Competences: To distinguish between the different forms of temporary evolution of the disease. To be capable of integrating all the disease determinants in the context of an epidemiologic triad. To know how it is transmitted and maintains a disease in a population.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi6: Causality

Descriptors: Introduction: Snieszko's scheme. Causal reasoning. Causality criteria: (Mill's canons, Postulates of Henle-Koch, Postulates of Hill ...). Causal models (unicausal deterministic, simple multicausal deterministic, advanced multicausal deterministic and probabilistic).

Competences: To understand the evolution of the concept of causality. To be capable of realizing a causal reasoning. To understand the Henle-Koch postulates and to justify its limitations. To understand the postulates of Hill and other causality criteria. To differ between the different causal models.

Teaching-learning activities:

- Lectures (teaching method): 1 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 1,5 h

Topic Epi7: Epidemiologic surveys

Descriptors: Definition of epidemiologic survey. Forms design (questions, answers, order, format...). Databases creation. Fulfil of surveys (method of collection of information, optimization of the value of an answer, achievement of pilot survey, configuration of the work team and cross-check and treatment of the information). Ethical considerations.

Competences: To be capable of selecting the necessary information in an epidemiological study. To be capable of discriminating between types of variables. To be capable of designing actively a questionnaire. To be able to gather information adapted for an epidemiologic investigation by means of surveys.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi8: Design of epidemiological studies

Descriptors: Criteria of classification of the epidemiological studies. Experimental studies (control groups, classification and blinding): advantages and disadvantages. Observational studies (cross sectional, case-control and cohorts): scheme, advantages and disadvantages. Ecological studies. Population screening.

Competences: To distinguish between studies as the criteria of classification. To raise the different types of studies as the looked targets.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi9: Cross-sectional observational studies

Descriptors: Basic concepts. Reasons (index, proportion and valuation). Definition of case and population at risk. Cross-sectional measurements: morbidity or prevalence, mortality and case fatality rate. Factors that influence the calculation: diagnostic accuracy and sample size. Raw values vs specific values. Standardization of results.

Competences: To differ between valuation and proportion. To measure the disease in a moment of certain time. To minimize the influence of variables of confusion on having measured the disease.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi10: Longitudinal observational studies

Descriptors: Longitudinal measurement of the disease: Prevalence (Point prevalence and Prevalence Period) and Incidences (Cumulative Incidence and Incidence Rate). Relations between parameters.

Competences: To quantify the disease and its evolution throughout a period of time.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi11: Risk estimation

Descriptors: Calculation and selection of risk estimators (Prevalence Ratio, Odds Ratio and Relative Risk). Calculation of confidence intervals. Interpretation of the risk. Other estimators of effect (Attributable Risk, Ethiological fraction, Attributable Risk of the Population and Ethiological fraction of the Population).

Competences: To select the risk estimator most adapted to every type of study. To calculate the most suitable risk estimator and to interpret the risk according to the design of study, selected risk estimator and its confidence interval. To know other estimators of interest related to the risk.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi12: Theory of decision

Descriptors: Decision under certainty (Mathematical Programming). Decision under risk: With experimentation (statistical inference) and without experimentation (bayesian probability): Expected utility. Causes of illogical decisions. Necessary number to Treat. Decision under uncertainty (Theory of Games).

Competences: To understand the different possible situations on having taken a decision. To apply the rules of Bayesian decision using epidemiologic results.

Teaching-learning activities:

- Lectures (teaching method): 2 h

- Student work: reading and comprehension of the theory, and achievement of the exercises, 3 h

THEORETICAL TOPICS OF BIOSTATISTICS

Topic BS1: Probability distributions

Descriptors: Probability. Random variable: types and classification. Distribution of probability of a random variable. Discrete and continuous probability distributions in veterinary sciences. Other fundamental distributions in statistical inference.

Competences: To be able to recognize the most of the random variables used in veterinary sciences and its probability distributions.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and problem solving: 3 h

Topic BS2: Conditional probability

Descriptors: Conditional probability. Concept of independence of random variables. Bayes Theorem. Application to the interpretation of a diagnosis.

Competences: To understand and to apply the concept of conditional probability. To recognize the independence between variables. To apply the Bayes theorem to the solving of real problems.

Teaching-learning activities:

- Lectures (teaching method): 1 h
- Student work: reading and comprehension of the theory, and problem solving: 1.5 h

Topic BS3: Frequencies

Descriptors: Frequency. Frequency Tables. Frequency tables for grouped and ungrouped data. Graphical Representation of Frequency Distribution.

Competences: To be able, from a set of information, to obtain the frequency tables that describes the statistical distribution of the data base.

Teaching-learning activities:

- Lectures (teaching method): 1 h
- Student work: reading and comprehension of the theory, and problem solving: 1.5 h

Topic BS4: Descriptive statistics

Descriptors: Descriptive statistics. Descriptive measures for a sample data. Moments measures (central tendency, variability and shape), and position measures (percentiles).

Competences: To be able to obtain and to interpret with the suitable computer free software the descriptive measurements of a set of sample data.

- Teaching-learning activities:
- Lectures (teaching method): 1 h
- Student work: reading and comprehension of the theory, and problem solving: 1.5 h

Topic BS5: Statistical inference I: confidence intervals

Descriptors: Definition of statistical inference. Sampling distribution of a given statistic based on a random sample. Obtaining a probability interval from the sampling distribution. Confidence intervals. Calculation of the confidence intervals most representative or used in the veterinary sciences.

Competences: To be able to obtain and to interpret with the suitable computer free software the confidence intervals to do inferences on the population parameters.

Teaching-learning activities:

- Lectures (teaching method): 1 h
- Student work: reading and comprehension of the theory, and problem solving: 1.5 h

Topic BS6: Statistical inference II: hypothesis contrast

Descriptors: Statistical hypothesis test. Definition of hypothesis test. Basic elements in a Test. Types of errors. The significance level. P-value concept.

Competences: To understand the concept of statistical hypothesis test as another application of the statistical

inference different from the estimation for confidence intervals. To be able of defining the basic hypothesis in the test. To be able to obtain and to explain the conclusion in a hypothesis test.

Teaching-learning activities:

- Lectures (teaching method): 2 h
- Student work: reading and comprehension of the theory, and problem solving: 3 h

Topic BS7: Statistical inference III: selection of tests of statistical contrast

Descriptors: Selection of the statistical test. Types of hypothesis testing. Parametric and nonparametric tests. The most commonly hypothesis tests used in statistical inference with application to the veterinary sciences.

Competences: o be able to apply the adequate hypothesis test depending on the null hypothesis.

Teaching-learning activities:

- Lectures (teaching method): 1 h
- Student work: reading and comprehension of the theory, and problem solving: 1.5 h

Topic BS8: Correlation models and linear regression

Descriptors: Two-dimensional quantitative variables. Concept of linear correlation coefficient. Linear regression model. Linear correlation model. Obtaining the best fit or regression lines. Residual analysis in regression.

Competences: To understand the concept of linear relation between two quantitative random variables. To distinguish between the correlation and the regression. To be able to calculate the correlation coefficient and the regression lines. To understand the analysis of the residuals.

Teaching-learning activities:

- Lectures (teaching method): 1 h
- Student work: reading and comprehension of the theory, and problem solving: 1.5 h

Seminar BS_prob: Problems of probability

Descriptors: To solve problems related with topics BS1, BS2, BS3 y BS4. Competences*:* To apply concepts included in topics BS1, BS2, BS3 y BS4.

Teaching-learning activities:

- Practical seminar: 1 h
- Student work: to solve problems in classroom: 1 h

Seminar BS_inf: Problems of statistical inference

Descriptors: To solve problems related with topics BS5, BS6 y BS7.

Competences: To apply concepts included in topics BS5, BS6 y BS7.

Teaching-learning activities:

- Practical seminar: 1 h
- Student work: to solve problems in classroom: 1 h

PRACTICES OF EPIDEMIOLOGY

Practice Epi1: Diagnostic tests

Descriptors and competences: The correspondents to the topic Epi3.

Activities education - learning:

- Practical classes: 2 h
- Student work:Student work: revision of theoretical concepts and review of the exercises 1 h

Practice Epi2: Calculation of sample size

Descriptors and competences: The correspondents to the topic Epi4.

Teaching-learning activities:

- Practical classes: 1,5 h
- Student work: revision of theoretical concepts and review of the exercises 1 h

Practice Epi3: Stratified results. Average values and differences between proportions

Descriptors and competences: he correspondents to the topics Epi4, Epi9 and BS7.

Teaching-learning activities:

- Practical classes: 1,5 h
- Student work: revision of theoretical concepts and review of the exercises 1 h

Practice Epi4: Cross-sectional disease measurements

Descriptors and competences: The correspondents to the topics Epi4 and Epi9.

Teaching-learning activities:

- Practical classes: 2 h
- Student work: revision of theoretical concepts and review of the exercises 1 h

Practice Epi5: Longitudinal disease measurements

Descriptors and competences: The correspondents to the topics Epi4 and Epi10.

Teaching-learning activities:

- Practical classes: 1,5 h
- Student work: revision of theoretical concepts and review of the exercises 1 h

Practice Epi6: Risk estimation

Descriptors and competences: The correspondents to the topics Epi4 and Epi11.

Teaching-learning activities:

- Practical classes: 2 h
- Student work: revision of theoretical concepts and review of the exercises 1 h

Epidemiological study

Descriptors and competences: The correspondents to all the realized topics of the subject of form integrated across the resolution of an epidemiological and statistical study of an animal population

Teaching-learning activities:

- Lectures (teaching method): 5,5 h (the first meeting of 2,5 h and the second meeting of 3 h)
- Student work: reading and comprehension of the theory, and achievement of the exercises, 2 h

PRACTICES OF BIOSTATISTICS

Practice BS1: Probability distributions

Descriptors and competences: The corresponding to the topics BS1, BS2 and BS3.

Teaching-learning activities:

- Practical classes: 2 h
- Student work: revision of theoretical concepts and review of the exercises 1 h
- Student work: reviewing of the theoretical concepts associated to the topics: 1h

Practice BS2: Descriptive statistics

Descriptors and competences: The corresponding to the topics BS4 and BS5.

Teaching-learning activities:

- Practical classes: 2 h
- Student work: reviewing of the theoretical concepts associated to the topics: 1h

Practice BS3: Introduction to the Statistical inference

Descriptors and competences: The corresponding to the topics BS6 and BS7.

Teaching-learning activities:

- Practical classes: 2 h
- Student work: reviewing of the theoretical concepts associated to the topics: 1h

Practice BS4: Correlation analysis. Simple Linear Regression Descriptors and competences: The corresponding to the topic BS8.

Teaching-learning activities:

- Practical classes: 2 h
- Student work: reviewing of the theoretical concepts associated to the topics: 1h

Summary of the activities of education - learning

Activity	Presential Hours	Factor	Autonomous work /No Attend	Total
Classes of theory	34	1.5	51	84
Seminars and problems	2	1.5	4	6
Practices	24	0.5	12	36
Practical work			15	15
Tutorships			5	5
Examinations			4	4
Total	**60**		**90**	**150**

Syllabus

The topics of both matters will be alternated to improve the knowledge integration, and it can change lightly the order depending on the academic calendar in force. All the changes will be notified across the teaching platform of the subject (http://alp4eb.winepi.net).

THEORETICAL TOPICS OF EPIDEMIOLOGY

Topic Epi1: Types of variables and scales of measurement

Topic Epi2: Introduction to the Epidemiology

Topic Epi3: Evaluation of diagnostic tests

Topic Epi4: Sampling

Topic Epi5: Elements of Qualitative Epidemiology

Topic Epi6: Causality

Topic Epi7: Epidemiologic surveys

Topic Epi8: Design of epidemiological studies

Topic Epi9: Cross-sectional observational studies

Topic Epi10: Longitudinal observational studies

Topic Epi11: Risk estimation

Topic Epi12: Theory of decision

THEORETICAL TOPICS OF BIOSTATISTICS

Topic BS1: Probability distributions

Topic BS2: Conditional probability

Topic BS3: Frequencies

Topic BS4: Descriptive statistics

Topic BS5: Statistical inference I: confidence intervals

Topic BS6: Statistical inference II: hypothesis contrast

Topic BS7: Statistical inference III: selection of tests of statistical contrast

Topic BS8: Models of interrelation and linear retrogression

Seminar BS_prob: Problems of probability

Seminar BS_inf: Problems of statistical inference

PRACTICES OF EPIDEMIOLOGY

Practice Epi1: Diagnostic tests

Practice Epi2: Calculation of sample size

Practice Epi3: Stratified results. Average values and differences between proportions

Practice Epi4: Cross-sectional disease measurements

Practice Epi5: Longitudinal disease measurements

Practice Epi6: Risk estimation

Epidemiological study

PRACTICES OF BIOSTATISTICS

Practice BS1: Probability distributions

Practice BS2: Descriptive statistics

Practice BS3: Introduction to the Statistical inference

Practice BS4: Correlation analysis. Simple Linear Regression

Course planning and calendar

The dates and key milestones of the subject are described in detail, together with those of the rest of subjects of the first course in the Veterinarian's Grade, on the Web page of the Faculty of Veterinary Sciences (https://veterinaria.unizar.es/horarios1vet). The above mentioned linkage will be updated to the beginning of every academic course.

Also they will be available of form more detailed across the teaching platform of the subject (http://alp4eb.winepi.net).

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28403

Universidad Zaragoza

Year : 2018/19

28404 - Basic sciences for veterinarians

Syllabus Information

Academic Year: 2018/19

Subject: 28404 - Basic sciences for veterinarians

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 1

Semester: First semester **Subject Type:** Basic Education **Module:**

General information

Aims of the course

The general aim of this subject is to ensure that students acquire a basic scientific training, which in turn is necessary for the understanding and analysis of the disciplines of the degree. On the other hand, through lab sessions, the student will learn to treat data and interpret results with critical sense, as well as to present their work reports, in which this critical sense is appreciated, as much in the content as in the continent of the same ones

Context and importance of this course in the degree

Due to the basic character of this subject, its passing must enable students to follow the rest of the course specific subjects of the degree.

Recommendations to take this course

Although this is a basic training subject, it is advisable to take subjects in Physics, Mathematics and Chemistry prior entering the degree.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Making use of scientific reasoning, with a critical character, in the analysis, synthesis and evaluation of real models, both physical and chemical.
2. Applying the acquired knowledge to the analysis and search of solution of problems. Contrast properly such solutions.
3. Using the computer applications related to the field of study.
4. Managing the basic instruments of chemistry and physics laboratories.
5. Using the Internet as a source of information, as well as a means of communication.
6. Master the aspects of communication, both oral and written. Demonstrate the ability to organise and plan work autonomously.

Learning outcomes

If students complete the course successfully, they should be able to

1. Obtain a function that adjusts a set of data, both theoretical and experimental.
2. Obtain the approximate value of a function at a point, when this function is not known.
3. Identify mathematical models that describe a system of populations.

4. Classify these models and obtaining the evolution of the population.
5. Use computer tools to solve the problems that arise in the previous sections.
6. Express concentration in its different forms.
7. Identify and interpreting chemical balances.
8. Identify the structures of organic compounds.
9. Name and formulate hydrocarbons and organic compounds with different functional groups.
10. Distinguish and recognizing asymmetric carbons and chiral molecules.
11. Handle chemical laboratory instruments, preparing dissolutions and working with them.
12. Identify the fundamental magnitudes of physics such as length, mass, temperature and time that appear in the problems to be solved.
13. Solve problems related to the basic knowledge of Fluids and Thermodynamics necessary for the subsequent studies of the career.
14. Apply the knowledge of the physical phenomena acquired in the previous sections to the laboratory practices.
15. Report on his work in chemistry and physics laboratories

Importance of learning outcomes

These learning outcomes are fundamental for, along with the other competencies that are acquired with the others subjects that make up the Basic Training Module, training students on a solid foundation that allows them to face the rest of the more specific modules of the degree in the best conditions, and thus shape their professional profile successfully.

In addition, laboratory work promotes the strengthening of generic or cross-cutting competencies that contribute to their integral formation as graduates.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria) Assessment

Assessment activities

The student must demonstrate that has achieved the expected learning outcomes by means of the following evaluation activities.

The subject is divided into three blocks of knowledge, Mathematics, Chemistry and Physics. The assessment will be for each block of content, with required minimums in each block to pass the entire subject. Both practice and theoretical competences will be assessed.

Each subject is evaluated independently, performing a partial test at the end of each one. Each subject will be evaluated with a maximum of 10 points, according to the following proportion:

- Theory - up to 70% of the final grade

- Practice - up to 30% of final grade

Students who have not passed any of the subjects with this methodology of continuous assessment, are entitled to a final test on the official dates convened by the Center, which will include a theoretical test and another practical, with the percentages mentioned above. In any case, every student has the right to this test on official announcement, whose grade will prevail over any grade previously obtained.

In order to pass each subject, it is necessary to obtain a minimum of 40% in each of the parts (theory and practice). The final grade of the subject will be obtained by averaging the grade of the three subjects, provided that a minimum grade of 4 is obtained in each subject.

In addition:

- A score between 4 and 5 in any subject may be offset with the rest of the subjects ONLY during the same academic year.

- The subject that obtains a grade superior or equal to 5, is considered passed for successive courses.

- Practices evaluated with a minimum of 40% are considered passed for successive courses.

Valuation criteria and requirement levels

It is a continuous assessment system, for which aptitudes are evaluated, regarding the capacity of scientific reasoning, the application of the acquired knowledge in the analysis and resolution of real problems. In face-to-face activities, the acquisition of transversal skills will be better appreciated and assessed. The students could be punished with up to a 10% of the practices grade when he/she didn't satisfy the rules that are of due compliance in laboratories, computer room, etc.

At the end of each subject, the student will have an examination of the subject (midterm exams), both in theory and in practice. In order to pass the midterm exam, students must obtain an average greater than or equal to 5. There is no need to take the final examination for those students who have managed to pass their midterm exams.

On the other hand, once a subject has been passed in the first session, this grade is saved for next sessions (so, a student who passes physics in the first exam, but not mathematics and chemistry, must take mathematics and chemistry in the next session).

The global test in the official calls, will consist of a written test, resolution of problems that comprises 70% of the qualification and a practical test, with 30%.

In order to pass the subject through the global test, the student must reach at least 40% of the grade in each of the evaluation activities for the three subjects. The final grade, the sum of these activities, should be 5, or higher.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree:

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose

Methodology, learning tasks, syllabus and resources

Methodological overview

DISCLAIMER

The English version is a translation of the original in Spanish for information purposes only. In case of a discrepancy, the Spanish original will prevail.

The course is divided into three blocks of different subjects. Each of one of these blocks has 7 hours of lectures, 4 hours of solving cases and problems and 9 hours of laboratory practical lessons.

Before the lectures, students will have the possibility to access to the corresponding material in the learning platform. Then, we carefully recommend a previous reading of this material for better assimilation. The material available to students at the learning platform includes so presentations of the theoretical concepts, as collections of problems proposed for each of them.

In addition, students will be provided of the scripts corresponding to the laboratory practical lessons. The problems sessions are working sessions in small groups, the teacher will propose some real problems at the beginning of the session and, at the end of the session will be solved on the board. The practical two-hour sessions will take place in the computer classroom, for math's, analytical chemistry laboratory, for chemistry, and physics laboratory for physics. The student must complete the steps corresponding to the script provided for each practical lesson. Previously, the teacher will explain with an example each one of these steps.

Learning tasks

PART I: MATHEMATICS

Block I. Review of the basic calculus concepts

Competences:

1. To be able to know the basic elements related to real functions of real variable, and the meaning of the continuity and derivability in real situations.
2. To be able to intuit the graph of a real function and to interpret it inside of each of the real context, to obtain conclusions about of the evolution of the process this function is describing. Then, to be able to take decisions.

Teaching and learning activities:

- Lectures: 0 lecture hours.
- Practice session (computer classroom): 1 session of 2 hours.
- Autonomous work and study: 7 hours.

Block II. Approximation

Competences:

1. To be able to recognize the problems where the analytic solution is not easy and understand the possibility of use the approximation theory to solve them, with a previously fixed precision.
2. To be able to distinguish the problems where the data belongs to a theoretical model, and the others where the data are experimental.

Teaching and learning activities:

- Lectures: 4 lecture hours.
- Practice seasons (computer classroom): 2 session of 2 hours.
- Problems: 1.5 hours of problems session at the classroom.
- Autonomous work and study: 14 hours.

Block III. Elementary discrete models

Competences:

To be able to understand the equation describing of a population grow. From this equation, to obtain the model of the population grow and the main conclusions about its evolution. To know the basic models of population grow.

Teaching and learning activities:

- Lectures: 4 lecture hours.
- Practice seasons (computer classroom): 1 session of 2 hours.
- Problems: 1.5 hours of problems session at the classroom.
- Autonomous work and study: 14 hours.

PART II: CHEMISTRY

Block I. General Chemistry

Competences:

1. To be able to know the different ways of expressing concentration.
2. To be able to transform the different expressions of concentration each other.
3. To be able to understand and resolve the issues that the expression of concentration is involved. Understanding the colligative properties of solutions.
4. To be able to understand and interpret chemical balances. Understanding the operation of the buffers and their operation and importance in living organisms.

Teaching and learning activities:

1. Lectures: 4 lecture hours.
2. Practice seasons (laboratory): 4 sessions of 2 hours.
3. Problems: 1.5 hours of problems session at the classroom
4. Autonomous work and study: 7 hours.

Block II. Organic Chemistry

Competences:

1. To be able to know the importance of organic chemistry, the characteristics of organic compounds, the different expressions of the molecular formulas.
2. To be able to know the structures of organic compounds. Know the difference between radical, functional group and homologous series. Knowing name and make hydrocarbons and organic compounds with different functional groups.
3. Know the difference between conformational, geometric and optical isomerism. Recognize the asymmetric carbons and chiral molecules. Understand and recognize the importance of chirality in biology.

Teaching and learning activities:

1. Lectures: 4 lecture hours.
2. Practice seasons (laboratory): 1 session of 2 hours.
3. Problems: 1.5 hours of problems session at the classroom
4. Autonomous work and study: 14 hours.

PART III: PHYSICS

Block I. Fluids

Competences:

1. To be able to know the physical basis of fluids applicable to veterinary science.
2. To be able to understand the behavior of blood as a fluid.

Teaching and learning activities:

- Lectures: 4 lecture hours.
- Practice seasons: 2 sessions of 2 hours.
- Problems: 2 hours of problem solving at the classroom.

Block II. Thermodynamics

Competences:

In addition to those described in paragraph 3 as generic, the student must acquire the following competences:

1. To be able to know the physical basis of thermodynamics that apply to the veterinary science.
2. To be able to understand the animal metabolism.
3. To be able to understand the thermoregulation processes in animals.

Teaching and learning activities:

- Lectures: 4 lecture hours.
- Practice seasons: 1 sessions of 2 hours. An exam of 1 hour.
- Problems: 4 hours of problem solving at the classroom.

Syllabus

PART I: MATHEMATICS

Block I. Review of the basic calculus concepts

Topics: Real functions of real variable. Limits, continuity and derivability. Graphical representation of functions. Basic mathematical functions. Biological models.

Block II. Approximation

Topics: Defining the problem of approximation. Interpolation and Lagrange method. How to fit a function to a data base.

Lineal fit and Least Squared method. Other fitting methods.

Block III. Elementary discrete models

Topics: Introduction to the elementary discrete models. Difference equations. Solution of the Difference Equations. Order 1 and 2. Populations grow.

PART II: CHEMISTRY

Block I. General Chemistry

Topics: Chemical solutions. Colligative properties of solutions. Electrolytes. Chemical equilibria. Acid-base equilibria. Buffer solutions. Amino acids.

Block II. Organic Chemistry

Topics: Introduction to Organic Chemistry. Nomenclature and Formulation of organic compounds. Constitutional isomerism and stereoisomerism.

PART III: PHYSICS

Block I. Fluids

Topics: Fluid statics. Pressure. Surface phenomena in fluids. Fluid dynamics. Viscosity. Hemodynamics (pressure, flow and resistance).

Block II. Thermodynamics

Topics: First Law of Thermodynamics. Heat and temperature. Heat capacity. Phase changes and latent heat. Heat transfer: conduction, convection and radiation. Temperature regulation and animal metabolism.

Course planning and calendar

It can be found on the website of the Faculty.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28404

Universidad Zaragoza

Year : 2018/19

28405 - Embryology and Anatomy I

Syllabus Information

Academic Year: 2019/20

Subject: 28405 - Embryology and Anatomy I

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 7.0

Year: 1

Semester: First semester

Subject Type: Basic Education

Module:

General information

Aims of the course

The aims of this course are to:

1. Acquire scientific and professional nomenclature and manual ability for application in their subsequent practices medical-surgical;
2. Serve as a base to study other clinical or pre-clinical subjects and for correlating the morphological data with the functional;
3. Be an essential part of the study and diagnosis of any clinical circumstance;
4. Be an instrumental part in solving functional or pathological problems;
5. Develop communication and observation skills and, therefore, to increase his or her intelligence and his or her ability to understand and have critical capacity;
6. Acquire and exercise information skills (IQ), through the virtual course Information Management in the Veterinary Degree;
7. Help to understand the organization of the living animal throughout its life cycle, as well as the interrelation of the multiple structures that study the rest of the disciplines of Anatomy;
8. Lead to know the ontogenetic history of all animals, especially domestic animals, from fertilization to death;
9. Help to understand, and then explain, the anomalies presented by the newborns, as well as their possible etiology and their possible consequences;
10. Allow to acquire a sufficiently solid base to be able to develop more easily in front of others materials;
11. Provide the basic tools for searching and managing information in any of its supports and storage and distribution media.

Context and importance of this course in the degree

The course, together with Embryology and Anatomy II of the second semester of the first year, aims to provide the basic knowledge of embryology and anatomy of domestic animals, contemplated in the list of competencies to be acquired by the Veterinary Graduate (Order ECI/33/2008), and which appear in the degree report of this 2 of 8 degree. The acquisition of competencies in morphology, topography and structure of organs and systems (Code: FBC05), in functioning and regulation of body apparatus and systems (Code FBC07), and in ontogenetic development, congenital anomalies and embryology applications (Code: FBC09) is explicitly contemplated.

This subject will also serve as a support for the acquisition and exercise of informational competencies (CI), through the virtual course BASIC DIGITAL COMPETITION: LEARN TO INFORM, TO CREATE AND TO COMMUNICATE DIGITALALLY

(basic level)

This course offers, through a common thematic thread that facilitates the elaboration of the class work, basic training in the following areas:

- INFORMATION AND DATA PROCESSING: to identify, locate, obtain, store, organize and analyze the digital information, evaluating its purpose and relevance.
- COMMUNICATION AND COLLABORATION: communicating in digital environments, sharing resources through networked tools.
- CREATION OF CONTENTS: create and edit new content, integrate previous knowledge, know how to apply the intellectual property rights and licenses of use.
- SECURITY: protection of information and personal data, security measures, responsible and safe use

Recommendations to take this course

There are no specific requirements, but training is required in health sciences subjects.

It is advisable to have general knowledge of the structure of domestic mammals and to be, to some extent, familiar with their management and functional activity.

A sufficient knowledge of English is desirable to facilitate broad access to bibliographic sources.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Internalize, evaluate and use the morphology, topography and structure of the organs and systems in order to perform the veterinarian's own activities.
2. Understand and integrate the operation and regulation of the body systems and appliances necessary for the performance of the profession.
3. Assimilate, interpret and make use of knowledge related to ontogenetic development, anomalies, etc. and applications of embryology in their professional work.
4. Search, manage and use information at a basic level

Learning Outcomes

If students complete the course successfully, they should be able to:

1. Identify and describe the embryonic stages and structures of the germinal and embryonic periods of the development of domestic animals, including ectoderm, mesoderm, endoderm and line derivatives germinal. Detail the structural changes and describe the principles governing the formation of the main apparatuses and body systems.
2. Explain and value the concepts related to the processes and mechanisms that control the development and to the embryo manipulation procedures. Describe, compare and differentiate placentation in the different domestic animals
3. Describe and understand the embryonic development of structures belonging to the locomotor apparatus and explain the embryonic origin of their congenital anomalies
4. Locate, name and be able to make a morphofunctional description of the elements and details of the bone and joint structure of the neck, trunk and extremities of domestic animals, recognizing these elements and their details in the radiographic images, as well as their projections and palpable reliefs on the surface of the animal.
5. Locate, name and be able to make a morphofunctional description of the muscles, nerves, vessels and other auxiliary elements related to, or delimited by, the apparatus locomotor of the neck, trunk and extremities of domestic animals, as well as their projections and situations or useful on the surface of the animal.
6. Search, manage and use information at a basic level.

Importance of learning outcomes

The knowledge of Morphology, together with that of Physiology, constitute the fundamental base on which the formation of the veterinarian is based, being more useful and necessary in the measure in which this learning is closely linked and oriented to the necessities imposed by the pathology, the clinic and the surgery. Specifically, Anatomy and Embryology are an essential part of this base, as they serve as the backbone of the structural and functional knowledge of organisms and facilitate subsequent learning of other subjects such as Pathology, Clinical Propaedeutics, Clinical Medicine and Surgery, Radiology and Diagnostic Imaging, Obstetrics and Reproduction, Hygiene and Food Inspection and others.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Assessment activities

The student must demonstrate that has achieved the expected learning outcomes by means of the following evaluation activities

1: Theoretical Exam (50% of final grade).

Design: written exam in the classroom. It includes multiple choice questions, short answer questions, essay-type questions, and images. In order to pass it is necessary to obtain at least half of the score.

2: Practical Exam (40% of the final grade).

Design: In the dissection room with the osteological material studied and the animals dissected in the course of the practices, a long series of structures and details that the student will have to identify and name in a questionnaire. In order to overcome it, it is necessary to obtain at least two thirds of the score.

3: Preparation of a paper (9% of the final grade)

Design: Preparation, delivery in pdf format (maximum 5 pages, including figures) and defense of a work in small groups (maximum: 3 students). The works will deal with topics proposed by the teaching staff referring to specific and complementary aspects of osteology and dissection not dealt with in the regulated of the programming of the practices or an anatomical study of the different anatomical regions of birds, exotic species, wild mammals, laboratory animals, etc.). The teaching staff will supervise the personal work of the students, showing them the procedures to follow to analyse and study the assigned material and guiding them in the search of information, in their assessment, and in relation to learning outcomes corresponding to competences informational.

4. Virtual Course on Information Management in the Veterinary Degree (1% of the final grade)

Valuation criteria and requirement levels

- Coherence and quality of information (25%)
- Clarity of exposure (25%)
- Degree of elaboration of the presentation (25%)
- Degree of personal involvement and contributions to the design and execution of the work (15%)
- Quality of the search and management of bibliographic and informational sources (10%)

The works will be evaluated by the academic staff.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As established in article 158 of the Statutes of the University of Zaragoza, the provisional grades will be shown at least during the next 7 days and the students will be detailed on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The teaching methodology is structured in three levels: theoretical classes where student participation is encouraged; also lab sessions and practical works/tasks development based on lab sessions are proposed.

Learning tasks

There will be the following activities:

Theoretical classes (50%): 35 hours. The main course contents are presented.

Practical classes with the active involvement of the student (31.5 hours). Different lab sessions are carried out. Notes for each lab session where the different activities are planned will be available before the session

Tutorial work for the preparation of internships (5 %): 3.5 hours including instruction issue specific dissecting awarded, performing / exhibition with colleagues

Virtual Course Information Management in the Degree of Veterinary Medicine.

- Tutorship. Students may solve any questions they might have about unclear contents of the course
- Evaluation: Set of theoretical and practical work and delivery of written works.

Syllabus

Theoretical classes

Session	TITLE
1	Introduction. Concept, Purpose and content of the Veterinary Anatomy. Division of Anatomy Study. Techniques. Organs and systems.
2	General Embriology. Concept, purpose and content of the Veterinary Embryology. Stages of prenatal development: germinal, embryonic and foetal periods.
3	Gametogenesis. General concepts. Spermatogenesis: phases, multiplication, maturation, transformation and release of sperm. Comparative morphology of sperm and abnormal forms. Oogenesis: phases, types of eggs. Egg birds.
4	Fertilization. Main events and consequences of fertilization. Polispermia. Parthenogenesis. Fertilization in birds. Segmentation, morulation and blastulation in mammals and birds. Hatching of the blastocyst.
5	Gastrulation in mammals and birds. Embryonic or organogenetic period. Derivatives of the germ layers: ectoblast, mesoblast and endoblast. Neurulation and training of sketches or primary organs. Appearance of body shape.
6	Introduction to the development and establishment of the Central and Peripheral Nervous Systems.
7	Cardiovascular system. Development of heart and vascular system. Description of the fetal circulation and changes that occur at birth. Congenital malformations.
8	Splanchnology. General concepts. Anterior, middle and posterior intestine. Derivatives of the pharynx: pharyngeal pouches. Gill slits.
9	Visceral arches. Language development and thyroid gland. Development and training of the lungs and pleura. Congenital malformations.
10	Respiratory System. Development of the skull and face. Palate development and training of oral and nasal cavities. Congenital malformations.
11	Concepts and mechanisms of development: differentiation, growth, cell migration, morphogenic movements, cellular adhesiveness and affinity. Cell death.
12	Control and genetic regulation of embryonic development. Transgenesis. In vitro fertilization. Embryo transfer. Handling blastocyst. Cloning.
13	Nidation or implantation. Embryonic appendages: yolk sac, amnion, allantois and

chorion. Embryonic and extraembryonic circulation.

14 Placentation. Anatomical and histological classification of placentas. Umbilical cord and chorionic sac. Evolution and characteristics of the chorionic sac in the different domestic species.

15 Locomotor System. Definition and parts. Phylogeny and ontogeny. Osteology: osteogenesis and their types. Bone structural organization. Bone biomechanics.

16 Arthrology: artrogénesis. Types of joints and elements that constitute them. Ligaments. Joint biomechanics.

17 Miology: myogenesis. Muscles: types and classification. Structural organization of striated skeletal muscle. Auxiliary locomotor structures.

18 Axil region. Embryonic development. Deformities and congenital anomalies. Regionalization and vertebral formula. Joints of the spine. Biomechanics and joint study: comparative anatomy.

19 Autochthonous muscles of the spine: classification. Muscles of the medial and lateral tracts: a comparative study. Tail muscles. Ventral neck muscles: classification and comparative study. Neck fascias.

20 Thorax: comparative study. Joints and muscles: classification and biomechanics. Diaphragm muscle: development, description and comparative study.

21 Abdominal muscles: development and classification. Linea alba, prepubic tendon and inguinal ligament. Inguinal canal. Comparative study.

22 Composition of a spinal nerve. Regional differences between the spinal nerves. Sensory and motor innervation of the neck, trunk and tail.

23 Vascularization of the neck, trunk and tail. Large vessels: aorta, vena cava and parietal branches. Azygos vein and its branches. Lymphatic system ontogeny. Lymph nodes and lymphatic vessels of the axial region: thoracic duct and chyle cistern.

24 Forelimb. Phylogeny and ontogeny of members: congenital anomalies.

25 Scapular fixator muscles: classification. Situation, relationships and movements of the scapula. Shoulder joint: articular surfaces, ligaments and movements. Motor muscles of the humerus: classification and comparative study.

26 Elbow joint: articular surfaces, ligaments and movements. Elbow motor muscles: functional classification and comparative study. Carpal joints and phalanges: comparative study of the articular surfaces, ligaments and movements.

27 Forearm muscles: functional classification and comparative study. Hand muscles: functional classification and comparative study.

28 Innervation of the forelimb: comparative study of the brachial plexus and its collateral and terminal branches.

29 Arterial, venous and lymphatic vascularization of the thoracic limb: a comparative study. Fascias and elastic and corneas structures of the extremities. Fingernail, unguicula and ungula. The hooves of ruminants and pigs. The helmet of the equines: morphology and functional organization.

30 Hindlimb. General concepts. Pelvic girdle: a comparative study. Hip joint: articular surfaces ligaments and movements. Femur skeletal muscles: classification.

31 Femur motor muscles: Comparative study.

32 Knee and proximal tibiofibular joints: articular surfaces, ligaments and movements. Motor muscles of the knee joint: classification and comparative study.

33 Comparative study of foot joints: articular surfaces, ligaments and movements. Leg and foot muscles.

34 Innervation of the hindlimb: comparative study of the lumbosacral plexus and its

	collateral and terminal branches.
35	Arterial, venous and lymphatic vascularization of the hindlimb: comparative study.

Fascias and synovial of the hindlimb: comparative study.

Practical classes

Practice

Number	Title
1	Anatomical planes. Nomenclature. Types of bones and basic structure. Spine vertebra type. Vertebral formula.
2	Cervical vertebrae: a comparative study. Nuchal skull face. Hyoid. Radiographs of the neck.
3	Thoracic vertebrae. Ribs and sternum. Lumbar, sacrum and caudal vertebrae. Introduction to the pelvis. Radiographs of the chest, abdomen and pelvis.
4	Scapula and humerus. Comparative study. Radiographs of back and arm.
5	Radius, Ulna, Carpus and Metacarpus. Radiographic study.
6	Phalanges. Helmet and hoofs. Anatomical and Radiographic study.
7	Innominate bone, femur and patella. Recognition of details and lateral radiographs.
8	Tibia, fibula and tarsus. Recognition of details and radiographs.
9	Surface Anatomy and Body Regions. Skin lifting of the neck, back, arm, thorax and abdomen region. Recognition of surface structures: superficial fascia.
10	Dissection of the lateral aspect of the neck: superficial, medium and deep planes.
11	Dissection of the ventral aspect of the neck: superficial and deep planes. Visceral cavity of the neck: limits, content and deep fascia of the neck.
12	Lateral planes of the thorax and abdomen I (disinsertion of the latissimus dorsi and trapezius). Epiaxial muscles of the spine. Intercostal muscles
13	Lateral planes of the thorax and abdomen II (disinsertion of the external and internal oblique muscles of the abdomen). Surface plane of the back and arm. Superficial dissection of pectoral muscles.
14	Dissection of the lateral aspect of back, shoulder and arm. Pectoral muscles.
15	Dissection of the armpit: arm brachial plexus and arterial and venous branches.
16	Dissection of the dorsal aspect of the forearm and hand.
17	Dissection of the caudal aspect of the forearm and hand.
18	Dissection of the rump and hip. Recognition of the important details for surgery in the region.
19	Dissection of the lateral and medial thigh. Recognition of the important details for surgery in the region.
20	Dissection of the knee and lateral leg. Recognition of the important details for surgery in the region.
21	Dissection of the caudal aspect of the leg and foot. Recognition of the important details for surgery in the region:

Course planning and calendar

The course calendar is defined by the Veterinary faculty calendar.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28405

Universidad Zaragoza

Year : 2018/19

28406 - Embryology and Anatomy II

Syllabus Information

Academic Year: 2018/19

Subject: 28406 - Embryology and Anatomy II

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 7.0

Year: 1

Semester: Second semester

Subject Type: Basic Education

Module:

General information

Aims of the course

The aims of this course are to:

1) Acquire scientific and professional nomenclature and manual ability for application in subsequent medical-surgical practices;
2) Be a basis for studying other clinical or pre-clinical subjects and for correlating morphological and functional data;
3) Be a basic part for the study and diagnosis of any clinical circumstance;
4) Be a basic part for solving functional or pathological problems;
5) Develop communication and observation skills and, therefore, to increase their intelligence and critical capacity.

The anatomy adopts two main forms of appreciation or approach, of which the first is the descriptive, with a systematic character, which is the most appropriate scheme to organize the agenda of the theoretical classes; the second, more to organize the programming and contents of the practical classes, consists in the comparative treatment of the structures together with their topographical relationships in the different anatomical regions, and deals with the applied aspects that such knowledge confers on the different projections that anatomy has towards other sciences.

The aims of Veterinary Embryology are to:

1) help to understand the organization of the living animal throughout its life cycle, as well as the interrelationship of the multiple animals. structures that study the rest of the disciplines of Anatomy;
2) Lead to know the ontogenetic history of all the ontogenetic animals, especially domestic ones, from fertilization to death;
3) Help to understand, and then to be able to explain the anomalies presented by neonates, as well as their possible aetiology and possible consequences;
4) Acquire a sufficiently solid base to be able to cope more easily with other materials.

Context and importance of this course in the degree

The subject, together with Embryology and Anatomy I of the first semester of the first year, aims to provide the basic knowledge of embryology and anatomy of domestic animals, included in the list of competencies to be acquired by the Graduate in Veterinary Medicine (Order ECI/33/2008), and which appear in the degree report of this degree. The acquisition of competencies in Morphology, Topography and Structure of the organs and systems (Code: FBC05), and in Otogenetic development, congenital anomalies and embryology applications. (Code: FBC09)

Recommendations to take this course

Although there are no specific regulatory requirements, in addition to training in health science subjects, it is advisable to have general knowledge of the structure of domestic mammals and to be, to some extent, familiar with their management and functional activity. A sufficient knowledge of English is desirable to facilitate broad access to bibliographic sources

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1) Internalize, evaluate and use the morphology, topography and structure of the organs and systems in the activities of the course. veterinarian.
2) Understand and integrate the operation and regulation of body systems and appliances necessary for the performance of the profession.
3) Assimilate, interpret and make use of knowledge related to ontogenetic development, congenital anomalies and applications of embryology in their professional work.

Learning outcomes

If students complete the course successfully, they should be able to:

1) Identify and describe the main structural and functional elements of the heart and of the respiratory, digestive and genitourinary apparatuses, of the endocrine glands and of the central nervous system and the organs of the nervous system.
2) Describe and understand the embryonic development of the structures belonging to the heart and to the senses of domestic animals respiratory, digestive and genitourinary systems, endocrine glands, central nervous system and sense organs of and to explain the embryonic origin of their congenital anomalies.

Importance of learning outcomes

The knowledge of Morphology, together with Physiology, constitute the fundamental base on which the formation of the veterinarian is based, being more useful and necessary since this learning is closely linked and oriented to the needs imposed by the pathology, the clinic and the surgery. Specifically, Anatomy and Embryology constitute an essential part of this base, as they serve as a vertebrating element of the structural and functional knowledge of organisms and facilitate the subsequent learning of other subjects such as Pathological Anatomy, Clinical Propaedeutics, Clinical Medicine and Surgery, Radiology and Diagnostic Imaging, Obstetrics and Reproduction, Hygiene and Food Inspection and others.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Assessment activities

1) Theoretical Exam (1/3 of the final grade).

Design: online exam in a computer room. It includes a number of 20 multiple-choice questions, with or without images, taken at random from a pre-established file. Consequently, each student will answer a personalized exam. Each question has several possible answers, of which one is true, others are false and one is blank. The answers correct answers add up to the score assigned to them, incorrectly answered answers subtract 1/3 from the score assigned to a question answered correctly; unanswered or blank questions do not score.

In order to overcome it, it is necessary to obtain at least half of the score.

2) Practical Exam (1/3 of the final grade).

Design: in the dissection room, using the osteological material studied and the animals dissected in the course of the practices, each student is proposed:

a) the location and identification, during 8 minutes, with the help of all the bibliographic material you want to use, of four elements and/or details of the bone and joint structure, as well as muscles, nerves, vessels and other elements related to, or delimited by the head, heart and respiratory, digestive and genitourinary systems, the endocrine glands and the central nervous system and sensory organs of domestic animals.

b) a brief 5-minute descriptive exposition of these four elements and/or details, in accordance with the

anatomical terminology.

In order to overcome it, it is necessary to obtain at least half of the score.

3) Practical work (1/3 of the final grade)

Design: preparation of one paper for each practice group (or other alternative grouping considered appropriate),

the result of which will be demonstrated by the delivery of anatomical preparations and a digital medium (usually CD or DVD) containing a document in .doc format (whose length, format and other particularities will be detailed in the page Moodle2 of the subject) and as many static and/or moving images as considered necessary to illustrate the work done. In addition, the work will be defended publicly by one of the students of the group chosen randomly. The maximum exposure time will be detailed in the rules published by the subject on their Moodle2 page.

Works will address specific and complementary aspects of osteology and dissection not dealt with in the regulated programming of the practices. The academic staff will propose the topics of the works and supervise the work of the groups, showing them the procedures to follow to analyse and study the assigned material and guiding them in the search of information and in its assessment.

it is necessary to obtain at least half of the score.

It is necessary to pass the three evaluation activities separately in order to pass the subject.

Tests for students who are not present or those who present themselves in other calls other than the first one.

Theoretical Examination.

Design: online exam in a computer room. It includes a certain number of multiple choice questions, with or without images, extracted at random from a pre-established file. Consequently, each student will take a personalize exam. Each question has several possible answers, of which one is right, others are false and one is blank. Correct answers add up the score assigned to them, incorrectly answered answers subtract 1/3 of the score assigned to a question answered correctly; unanswered or blank questions do not score.

In order to overcome it, it is necessary to obtain at least half of the score.

For the practical work as well as for the practical examination, the condition of passed will be conserved if so happens in any previous call.

Valuation criteria and requirement levels

The student will demonstrate the ability to locate, name, and recognize the elements and details of the heart, as well as the respiratory, digestive, and genitourinary systems, the endocrine glands, and the central nervous system and sensory organs of domestic animals.

Their ability to identify the embryonic development of heart, respiratory, digestive and genitourinary structures, endocrine glands and the central nervous system and sensory organs of domestic animals, and explain the embryonic origin of their congenital anomalies, will also be tested.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose

Methodology, learning tasks, syllabus and resources Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented.

Students are expected to actively participate in class sessions throughout the whole semester.

Classroom materials will be available via Moodle. These include a repository of lecture notes used in class, the course syllabus, as well as other course-specific learning materials, including a discussion forum.

Further information regarding the course will be provided on the first day of class.

Learning tasks

The program that the student is offered to help achieve the expected results includes the following activities ...

The learning of anatomy is carried out according to two main forms of content organization: the first is the descriptive one, with a systematic character, which is the most appropriate scheme to organize the syllabus of the theoretical classes, masterly and taught in the classroom; the second one, more appropriate to organize the programming and contents of the practical classes, consists of the topographical and regional approximation of anatomical structures, together with their relationships, carrying it out in the dissection room.

This is a 7.0 ECTS course organized as follows:

Theoretical teaching 50%: 35 contact hours' participative lecture, distributed in 35/1 hour sessions.

Type of activity	Place	Schedule	Schedule	Students
Lectures groups 1-6 (35 contact hours)	Classroom	3 sessions/week (35 sessions)	1 hour/session	80
Lectures groups 7-12 (35 contact hours)	Classroom	3 sessions/week (35 sessions)	1 hour/session	80

Practical teaching 45%: 31.5 contact dissection hours, distributed in 21 sessions of 1.5 hours

Tutored preparation work practices 5%: 3.5 hours, including specific instruction of the awarded subject of dissection, performance / exhibition with fellow dissecting table.

Type of activity	Place	Schedule	Schedule	Students
Supervised work Instruction dissection (3,5 contact hours in rotational mode)	Dissection Room	2 sessions/week	2 hour/session	12
Groups 7 Practical 12 (31,5 contact hours)	Dissection Room	2 sessions/week	1,5 hour/session	80
Groups 1 Practical 6 (31,5 contact hours)	Dissection Room	2 sessions/week	1,5 hour/session	80

Development of an anatomical work by each group of practices, whose result will be demonstrated delivering an anatomical preparations and a digital device (usually: CD or DVD) containing a .doc formatted document (whose extension, format and other characteristics will be detailed on the Moodle2 on-line page of the course) and as many static and / or moving images as necessary to properly illustrate the work. On the other hand, public defense of the work will be carried out by a randomly chosen student of the group of practices, according to the rules published on the Moodle2 website. Anatomical work will focus on specific and complementary aspects of osteology and/or dissection in formal programming practices. Teachers will propose topics for that work and will supervise them, showing procedures in order to analyze and study the supplied material and helping in the search for information and assessment.

Syllabus

Embryonic origin, parts, situation, relationships, functional structure, vascularization, innervation:

- Respiratory System.
- Digestive system.
- Head.
- Urogenital apparatus.
- Central nervous system and sense organs.

Course planning and calendar

Schedule sessions and presentation of works

The dates and key milestones of the subject are described in detail, along with other subjects, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es / gradoveterinaria /). This link will be updated at the beginning of each academic year and will be complemented with detailed information on the Moodle2 page.

Theoretical classes: from the first school day in February to the last school day in May. Practical classes: since its inception in February to the last school day in May.

Final date for submission of groupal anatomical work: May (dates on Moodle2 website).

Review of submitted anatomical work: May (dates on Moodle2 website).

Practical exam: May or June (dates on Moodle2 website).

Theoretical exam: June (1st call) and September (2nd call)

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28406

Universidad Zaragoza

Year : 2018/19

28407 - Economics and business

Syllabus Information

Academic Year: 2018/19

Subject: 28407 - Economics and business

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 1

Semester: Second semester **Subject Type:** Basic Education **Module:**

General information

Aims of the course

The subject, which is linked to the social sciences that aims to provide knowledge and/or skills related, above all, to the market and agri-food chains, business and agricultural production, presents as a generic objective contextualize in the social reality, agriculture and food, in which they will develop skills in the exercise of the various professional profiles that define the Degree.

Context and importance of this course in the degree

The subject, as a subject linked to the social sciences, aims to provide knowledge and/or skills related, above all, to the market and agri-food chains, business and livestock production. On the other hand, the subject is also necessary to address and contextualize the learning outcomes to be obtained by the student in other subjects.

Recommendations to take this course

In order to take this subject, no previous studies of any specific subject are required. However, the fact that students have studied subjects in the field of social sciences fosters their learning.

It would be desirable that students might have the following abilities:

- Ability to adapt to the type of scientific-social knowledge and abstract thinking.
- Ability to analyze the social environment and synthesis.

Competences Learning outcomes

Competences

On successful completion of this course, students will be able to

1. Explain the object and key concepts of Economics and its relationship with social behaviors.
2. Analyze and interpret how demand and supply act together in the agricultural products market and understand the role that prices play as signals to effectively allocate scarce resources.
3. Interpret which product markets do not meet the characteristics of competitive markets; the externalities generated by them and the public solutions that are arbitrated.
4. Analyze the value chains of agricultural products and the role played by the different operators involved in them and the functions that they perform
5. Analyze and interpret the principles of Theory of Production, substitution of productive factors and changes of technique.
6. Understand the general nature of production and service companies, and entrepreneurs and the singularities of family farms, which are in the majority in our economic sphere.
7. Understand the basics of Animal Health Economics and apply basic tools for the analysis of health projects.

8. Explain and apply basic instruments of analysis and financial productive management and of analysis of investments in the company, and instruments of global management of agricultural companies.
9. Understand and explain the implications of agricultural and development policies on the sustainability of livestock systems and livestock activities in general.
10. Correct and effective communication, in writing and speaking in public in the Spanish language.
11. Skillful at oral and written communication in Spanish language
12. Critical thinking (analyze, synthesize and evaluate).
13. Search and manage bibliographic information, mainly through new search tools.

Learning goals

If students complete the course successfully, they should be able to

1. Delimit the scope of the economy and know the basic rules of market functioning.
2. Understand the concepts of supply, demand and price elasticity of demand, as well as the main factors that condition them.
3. Explain the characteristics of competitive markets and generally the price formation mechanism
4. Be familiar with the environment, structure, dynamics and potentialities of the agrifood sector and be able to analyze agricultural productions.
5. Understand the fundamentals of the microeconomic theory of production, the change of technique, the optimal technique and the economic principles of factors substitution.
6. Acknowledge the economic and productive implications of the current socio-economic environment of agriculture and livestock; the functions of the State and the tools it uses to influence economic activity, to limit the market power of companies and to regulate business activity. In particular, it is aware of the role of the State as a defender of the environment.
7. Understand the importance of the marketing of livestock products and the structure and functioning of the value chains of the main supply species.
8. Learn about the implications of agrarian, livestock and agro-silvopastoral systems on sustainability and development.
9. Have acquired the origin, principles and general functioning of the Common Agricultural Policy (CAP), as well as quality policies.
10. Explain what is a company, and the main types of agricultural and agri-food companies; what functions are developed by the entrepreneur and quantify the results obtained by the company and the measure of rationality
11. Know the documents that synthesize the information of the company necessary for the analysis and the economic-financial as well as technical management
12. Explain and use basic instruments and methods in the productive management of the company (calculation of costs and profitability thresholds, technical-economic ratios), in financial management (financial ratios) and in the analysis of investments.
13. Know and explain marketing as a technique that relates the commercial company to its environment, as well as the methods used in market research and policies (product, price, distribution, communication, sales promotion) that includes the marketing plan.
14. Know and be able to explain the main analytical management methods applied by the centres (public and private) for the management of family farms (comparative methods, margin methods, etc...).

Importance of learning outcomes

The subject competences enable the student, as has been pointed out, to understand the socio-cultural context in which she/he will develop his specific professional activity as a private service provider (clinical, sanitary), a technician in livestock production systems, a technician in various areas of agro-industry or a sanitary or agrarian technician at the service of public administrations.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities:

Resolution and delivery of the cases resolved in each of the practical classes referred to the theoretical blocks of the subject. The realization of a bibliographic search and exposition of a topic proposed by the professors based on the theoretical contents of the subject. Passing this evaluation will contribute to accredit the achievement of learning outcomes 2, 3, 5, 6, 10, 11, 12, 13 and 14.

Final written evaluation test with multiple choice questions (between 45-55 questions) referring to the theoretical blocks of the subject and to the resolution of cases solved in theoretical and practical classes. Passing this evaluation will contribute to the accreditation of the achievement of learning outcomes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14.

Evaluation criteria and requirement levels for the thematic blocks I, II, and III of the subject:

1. Resolution and delivery of the cases resolved in each of the practical classes referred to the theoretical blocks of the subject. For the evaluation, the following criteria will be applied: level of use of the session practice, proper use of theoretical concepts, correct resolution and formal aspects of the presentation. The evaluation will be carried out in the following way: the rating will be from 0 to 10 and will serve to contribute a maximum of the 10% to the grade of the final evaluation test of the subject. However, this criterion will be applied once passed the final written assessment test
2. Presentation of a theme proposed by the teachers and based on the theoretical contents of the subject, fundamentally of Block II. It will be valued the search of bibliography carried out and the handling of bibliographic sources in English, the capacity to communicate orally and in writing, as well as the capacity of analysis and synthesis. In addition, the exhibition will evaluate the orderly structure of presentation and teamwork, the format of presentation (power point), as well as the ability to respond adequately to those questions that arise related to the work presented. In order to overcome this activity, a bibliographic search will be required, the elaboration and delivery of a scheme with the structure of the presentation and the bibliographic references consulted and finally the group exhibition of the subject. The grade will be from 0 to 10 and this grade will be 10% of the final grade of the student once passed the final evaluation test.
3. Final written assessment test with multiple choice questions with four answer options. These tests will be assessed in accordance with the criteria and levels of requirement set out below: Wrong answers will be scored -0.33 points. The score will be from 0 to 10 and in order to pass the test it will be necessary to obtain a 5.This test will have a weight in the final grade of 80%

Tests for students who are not in attendance or those who present themselves at other sessions than the first

With regard to non-presential students, if they have taken any of the objective tests, the evaluation of problems and the final evaluation test, the criteria and levels of demand will be identical to those of face-to-face students. Otherwise, in the absence of the previous tests or the problem-solving test, the written test of final evaluation will account for 100% of the final grade.

Similarly, in the case of students who have not passed the subject in previous assessments and have not taken objective or problem-solving tests again, the new final written assessment test will be 100% of the final grade. If the objective tests and problem solving assessments are passed, the same criteria will be considered for the final grade as for face-to-face students.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning activities are mainly organised in 45 lecture and interactive sessions, and 10 hours of practical activities. The latter activities include case studies solving, organised in classes of 2 hours, and a 5 hours group-activity comprising on a literature review, and the search for specific information through Internet, the elaboration and delivery of the speech's outline, and the oral presentation of a brief speech. The topic of the aforementioned speech is based on the subject's content and is proposed by lecturers. A workshop with a manager of a veterinary/food company, and/or a researcher will also be carried out.

Learning tasks

Section I. Core concepts on Economics and Agricultural Economics. The production and Environmental Economy.

Learning activities:

- Lecture session: 20 hours
- Autonomous work and study: 35 hours
- Case study solving: 4 hours

Section II. Framework of current agriculture and livestock.

Learning activities:

- Lecture session: 10 hours
- Private study: 20 hours
- Literature review, the speech's outline, and the oral presentation of a brief speech: 5 hours
- Individual activity: 3 hours

Section III. Economics and management of farm enterprises and veterinary clinics

Learning activities:

- Lecture sessions: 15 hours
- Private study: 30 hours
- Case studies solving: 6 hours
- Individual activity: 2 hours
- Workshop with a manager of a veterinary/food company, and/or a researcher: 2 hours

Syllabus

Section I. Core concepts on Economics and Agricultural Economics. The production and Environmental Economy.

Concepts of the Economic Science Supply, demand and market. Changes in supply and demand, elasticity, types of market. Consumer and utility. The company in a perfect competition market. The production theory I. Production function, productivity, and technical change. The production theory II. The input factors. Economy, state and Environment.

Section II. Framework of current agriculture and livestock.

Agro-food marketing: utilities, functions and marketing services. Commercial agents and commercial channels. The beef meat value chain. The sheep meat value chain. The meat pig value chain. The meat chicken value chain. Agricultural policy: concept, models of agricultural policies. Common Agricultural Policy. Local food systems: quality and origin. Organic agriculture. Fair trade.

Section III. Economics and management of farm enterprises and veterinary clinics

Business, entrepreneur and business management. Technical and economic business achievement. Balance sheet and technical-economic information for farm business management. Costs in production process. Break-even point. Analysis and economic assessment of investments. Financial function. Financial sources in business.

Financial and economic analysis of business. Marketing. Market and social orientation of business. Marketing as business function. Marketing-mix. Marketing decision variables. Consumer/customer behaviour. Quality dimensions of a service. Commercial information and market research. Analysis and management of livestock farming systems. Analytical methods of management.

Course planning and calendar

For further details concerning the timetable, classroom and other information of the course please refer to the Programación de primer curso de Veterinaria?web site (link: http://veterinaria.unizar.es/gradovet/). The information will be updated at the beginning of the course.

Classroom activities	HOURS	Non-presential activities	HOURS	TOTAL
Lecture sessions	43	Private study	85	
Workshop/s	2	Self-assessment questions	2	
Case studies solving	10	Literature and Internet search, outline and speech	3	
Literature and Internet search, outline and speech	5			
TOTAL	60		90	150

Bibliography

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28407

Universidad Zaragoza

Year : 2018/19

28408 - Animal Physiology

Syllabus Information

Academic Year: 2018/19

Subject: 28408 - Animal Physiology

Faculty / School: 105 – Faculty of Veterinary Medicine

Degree: 451 - Degree in Veterinary Science

ECTS: 12.0

Year: 2

Semester: Annual

Subject Type: Basic Education

Module: Physiology

General information

Aims of the course

The general objective of this subject will be the learning of the functions of the organs and systems of the animal organism, their regulation and their application to animal medicine and production.

In order to achieve this general objective, the specific learning objectives of Animal Physiology will be:

- Knowing, understanding and describing the functioning of systems, devices and organs of healthy mammals and birds (especially those of veterinary interest), at their different levels of organisation.

- Knowing the mechanisms by which these living beings perform their functions.

- Understanding the interrelation, coordination and regulation of the various organic functions, as well as the processes of integration that give rise to homeostasis.

- Understanding and knowing how to use the scientific and technological terminology of Animal Physiology properly.

- Become familiar with the experimental techniques associated with a laboratory of Physiology and handling the basic scientific instrumentation, as well as acquiring the necessary skills for the realization of certain functional tests in animals.

- Analysing the different parameters obtained after the performance of functional or laboratory tests, knowing the normal results coming from healthy animals.

- Understanding the concept of Animal Physiology and its applications in Clinic and Health, Animal Production and other veterinary disciplines.

- Acquiring the physiological bases for the understanding of physiopathology and the mechanisms causing the disease, therapeutics and the means for the maintenance of health and the prevention of diseases.

- Knowing the fundamental bibliographic sources of this science and being able to manage them and search for references.

- Ability to understand physiological scientific works published in specialized journals.

- Knowing the methodologies from which physiological knowledge has been acquired.

- Knowing the possibilities of development of the personal work within the basic sciences in other aspects, in order to be able to orient the professional activity towards the teaching and the investigation.

- Knowing how to adapt to changing scientific and technological schemes in Physiology.

Context and importance of this course in the degree

Animal Physiology, as a basic subject, should allow students for the acquisition of the necessary skills to take the rest of the subjects of the Degree, especially those integrated into the modules of Clinical Sciences and Animal Health and Animal Production.

Recommendations to take this course

The student must have taken all first year subjects of the Degree and be enrolled in the subjects that, if applicable, have been pending in that course.

It is necessary to have a solid knowledge of animal anatomy and histology, as well as biology and biochemistry.

It is also important to understand the physicochemical bases applicable to the study of the function of the animal organism.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Know and interpret the physiological processes of the animal organism's apparatuses and systems.
2. Apply theoretical knowledge to the analysis of practical situations in real contexts.
3. Develop critical reasoning and capacities for analysis, synthesis and evaluation.
4. Effective and correct communication, using the appropriate scientific terminology.
5. Understand certain English language basic terminology related to the subject.
6. Skillful at computer applications used for the study of physiological processes.
7. Organise and plan work autonomously and manage information sources properly.
8. Integrating in team work to achieve common objectives, distributing and sharing responsibilities.

Learning outcomes

If students complete the course successfully, they should be able to:

1. Know, understand and explain the physiological fundamentals of the different systems of the animal organism (nervous, endocrine, cardiovascular, respiratory, renal, digestive and reproductive), as well as the mechanisms for the maintenance of homeostasis and physiological adaptations.
2. Interrelate different concepts and knowledge to describe the overall functioning of the organism and its regulation.
3. Use properly the scientific terminology specific to this subject.
4. Handle the basic scientific instrumentation, obtain data through the performance of physiological techniques in the laboratory as well as analyze such data to explain certain physiological phenomena.
5. Acquire necessary skills to perform certain functional tests on animals and ability to interpret them.

Importance of learning outcomes

The acquisition of the learning goals make possible to understand the fundamental principles of Animal Physiology, as a basic subject, with a view to its application to the study of other Degree subjects in the fields of Nutrition, Pharmacology and Therapeutics, Propaedeutic, Medicine and Surgery, Obstetrics and Reproduction, Animal Health and Production, among others.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Theoretical classes will be assessed by written tests consisting of 30 multiple-choice questions and 12 short answer questions. Passing these tests will demonstrate the achievement of learning outcomes 1, 2 and 3.

At the end of each practice, the teacher will verify that the student has passed the objectives of the practice. The evaluation will be complemented with a written examination of 10 short questions. Passing them will guarantee the achievement of learning outcomes 4 and 5.

Test 1. First part. It will include the thematic blocks I to VI of the theoretical program. It will represent 40% of the final grade.

Test 2. Second part. It will include the thematic blocks VII to X of the theoretical program. It will suppose 40% of the final grade.

Test 3. Practical examination. Acquisition of skills and abilities in the execution of the different practices of laboratory or computer room, as well as in the development of the realized clinical cases will be assessed. In addition, there will

be a written examination of 10 short answer questions. It will be 20% of the final grade.

Assessments of tests 1 and 2 will take place on the dates indicated in the examination schedule drawn up by the centre.

Test 3 will be called additionally during the course of the school year, after the end of the practices, in the month of May, as well as in the official calls.

Valuation criteria and requirement levels

In order to pass the theoretical part of the course, both written exams must be passed: Tests 1 and 2.

Each of the written examinations will consist of two parts:

1. 30 multiple choice questions (1 correct answer out of 4 possible options): The incorrect answers will not be penalized with negative points. This test will be evaluated on 10 final points and to obtain the score equivalent to 5, it will be necessary to reach 60% of the maximum score.
2. 12 short questions. This test will be evaluated on 10 final points and to obtain the score equivalent to 5, 50% of the maximum score must be reached.

The final grade of the written examination will be calculated by means of the weighted sum of the two parts, 40% of which correspond to the multiple-choice questions and 60% to the short questions.

A minimum score of 5 points is required to pass each midterm exam. However, from a score of 4.7 in one partial, you can make up what is missing up to 5 points if you overcome this difference in the other midterm exam.

In each of the official announcements (June and September) the student may apply for one or both partial, according to his or her own criteria. In addition, the option of being able to take test 1 (first partial) at the end of the first four-month period (January-February) will be given, without in this case involving the consumption of a summons.

Passed partial will be kept and counted only during the current academic year.

In order to pass the practical part of the course, it must first be demonstrated that the necessary skills and abilities have been acquired for the correct execution of the practices summoned throughout the different sessions. This will be done through direct observation of the student's work by the teacher, during the various face-to-face practice sessions. A student who demonstrates having acquired such skills will be given the grade of fit in this part. If it is not demonstrated in this way, a practical test will be carried out in the laboratory in each of the official announcements, consisting of the execution and oral explanation in the laboratory of any practice included in the program.

In addition, all students will take an exam consisting of 10 short questions about the contents of the practical program, each of which will be assessed with a maximum of 1 point. In order to pass this exam, a minimum of 5 out of 10 points must be obtained.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4.9: FAIL.

5.0-6.9: PASS

7.0-8.9: GOOD (NT).

9.0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

The passing of the practices and their qualification will be maintained for successive calls of the subject in subsequent courses, within the Grade.

Methodology, learning tasks, syllabus and resources

Methodological overview

The subject is structured in 10 thematic blocks and each of them includes the study of the Physiology of one organ system. There are 50 topics that are given in 78 hours of participatory lectures. The program is complemented with 34 hours of laboratory practices or in the computer classroom. There are 22 practices distributed in 11 practical sessions that they will be adjusted over time, where possible, to the developed concepts in the lectures. The 4 hours of programmed seminars will serve to reinforce and to discuss part of physiological concepts developed throughout the course.

Within the practical program, each student will also receive 2 sessions of clinical cases, with a duration of 2 hours per

session, in order to reinforce, relate and integrate the knowledge acquired during the theoretical and practical sessions of the course.

Learning tasks

The program offered to the student in helping to achieve the expected results includes the following activities:

- **Lectures:** 78 hours of theoretical classes will be given. They included a first class of introduction and presentation of the subject. They will be given in the classroom, with the students divided in two groups.
- **Seminars:** 4 hours of seminars will be given also in the classroom in the same groups of theoretical classes.
- **Practical classes:** A total of 34 hours of practical classes will be given in the Laboratory of Physiology or in the Computer classroom. They will be distributed in 11 sessions of 3 to 4 hours in the groups programmed by the Faculty. Each practical class will start with an explanation of the session and then students will perform the practice under continuous supervision by teachers. The obtained results will be analyzed at the end of the practical session. Guide notes and specific materials for its understanding and fulfilment will be available for the students.

Within the practical program, each student will receive two sessions of clinical cases, each one of a duration of 2 hours. These sessions will be held at the beginning and at the end of the second semester. In each session contents of the theoretical and practical program will be reviewed, with an applied pathophysiological approach. In this way, the students can integrate knowledge and apply it to the study of pathological processes in subsequent subjects of the degree.

Syllabus

A) Lectures

Theoretical classes are distributed in 10 thematic blocks, with a chronology and assignment of hours that is described in detail below.

I Introduction to Animal Physiology (1 h).

II General Physiology (7 h).

III Physiology of the Nervous System (10 h).

IV Internal environment: Blood (3 h).

V Cardiovascular Physiology (9 h).

VI Gastrointestinal Physiology (12 h).

VII Respiratory Physiology (6 h).

VIII Renal Physiology (6 h).

IX Endocrinology (12 h).

X Reproduction (12 h).

Thematic blocks I to VI will be included in the first partial exam of the subject, whereas sections VII to X will constitute the second partial exam.

I. Introduction to Animal Physiology (1 h)

Topic 0. Concept of Animal Physiology. Objectives. Relation to other sciences. The Physiology in the context of the Veterinary Degree. Bibliographical sources.

II. General Physiology (7 h)

Topic 1. Homeostasis. Internal environment and biological fluids.

Topic 2. Physiology of excitable tissues. Resting membrane potential. Action potential. Transmission of the nerve impulse.

Topic 3. Synapse: Chemical synapse. Postsynaptic potentials. Electrical synapse. Neurotransmitters. Neuromuscular transmission.

Topic 4. Skeletal muscle, cardiac muscle and smooth muscle: Action potentials. Excitation-contraction coupling.

III. Physiology of the Nervous System (10 h)

Topic 5. Sensory receptors. Transduction of sensory stimuli. Adaptation of receptors.

Topic 6. Somatovisceral sensitivity. Cutaneous mechanoreception, proprioception and kinesthesia. Thermal and pain sensitivity. Somatovisceral sensitivity transmission and cortical integration.

Topic 7. Chemical Senses. Taste. Smell.

Topic 8. Hearing. Range of hearing in several species. Phonoreceptors. Sense of Equilibrium: Functions of the vestibular system.

Topic 9. Vision. Ocular optics. Accommodation. Pupillary reflexes. Retina and photoreceptors. Chromatic vision. Field of vision. Binocular vision. Visual pathways.

Topic 10. Motor activity. Spinal reflexes. Motor functions of the brain stem, cerebellum, basal ganglia and cerebral cortex.

Topic 11. Autonomic nervous system. Sympathetic system. Parasympathetic system. Nervous centers regulating visceral function.

IV. Internal environment: Blood (3 h)

Topic 12. General properties of blood. Components of blood. Hematopoiesis. Functions of erythrocytes and leukocytes.

Topic 13. Platelets. Hemostasis. Blood coagulation. Fibrinolysis.

V. Cardiovascular Physiology (9 h)

Topic 14. Electrical activity of the heart. Pacemaker and conduction system of the cardiac impulse. Electrocardiography.

Topic 15. Mechanical activity of the heart. Cardiac cycle. Cardiac output and work of the heart.

Topic 16. Regulation of the cardiac activity. Intrinsic control: length-tension relationship. Extrinsic control: effects on rate and contraction force.

Topic 17. Systemic circulation. Blood pressure and vascular resistance. Circulation in arteries and arterioles. Venous circulation.

Topic 18. Capillary circulation. Capillary dynamics. Lymphatic circulation.

Topic 19. Mechanisms of neuroendocrine regulation of the peripheral blood circulation. Local control of tissue blood flow. Regulation of the arterial pressure.

VI. Gastrointestinal Physiology (12 h)

Topic 20. Regulatory systems of the gastrointestinal functions. Regulation of food intake.

Topic 21. Salivary secretion. Mastication. Swallowing. Functions of the esophagus.

Topic 22. Functions of the stomach: Secretion, digestion and motility. Vomiting.

Topic 23. Physiology of the ruminant forestomach. Functional characteristics of the preruminant animals. Motility of the forestomach and abomasum. Rumination and eructation. Fermentative digestion.

Topic 24. Exocrine pancreatic secretion. Biliary secretion. Functions of the gallbladder.

Topic 25. Functions of the small intestine. Secretion, motility, enzymatic digestion and absorption.

Topic 26. Functions of the large intestine. Motility. Fermentative digestion. Secretion and absorption. Defecation.

Topic 27. Avian digestion. Functions of the crop, muscular stomach, small intestine and cecum.

VII.Respiratory Physiology (6 h)

Topic 28. Pulmonary ventilation. Mechanics of pulmonary ventilation. Respiratory dead space. Ventilation and perfusion relationships.

Topic 29. Exchange of gases (O_2 and CO_2) through the respiratory membrane. Gas transport in the blood. O_2 y CO_2 dissociation curves. Gas exchange between the blood and tissues.

Topic 30. Regulation of respiration. The respiratory center. Neural and humoral control of respiration. Other functions of the respiratory system.

Topic 31. Respiration in birds. Mechanics of breathing: lungs and air sacs. Gas exchange. Control of breathing.

VIII. Renal Physiology (6 h)

Topic 32. Functions of the kidney. Glomerular function. Glomerular filtration rate. Renal clearance. Renal autoregulation.

Topic 33. Tubular functions: Tubular reabsorption and secretion.

Topic 34. Mechanisms of urinary concentration and dilution.

Topic 35. Regulation of acid-base balance. Renal mechanisms of pH control. Micturition reflex and its regulation.

IX. Endocrinology (12 h)

Topic 36. General characteristics of the endocrine system. Concept of hormone. Chemical nature of hormones. General process of hormone synthesis, transport and degradation. Mechanisms of hormone action. Regulation.

Topic 37. Hypothalamic hormones. The hypothalamic-pituitary axis.

Topic 38. Hormones of the adenohypophysis. Prolactin-growth hormone family, corticotropin, gonadotropins, and thyrotropin. Biosynthesis. Function and regulation. Intermediate lobe of the hypophysis: melanocyte-stimulating hormone

Topic 39. Hormones of the neurohypophysis: vasopressin or antidiuretic hormone and oxytocin.

Topic 40. Thyroid hormones: synthesis, physiological effects and regulation.

Topic 41. Hormones involved in the metabolism of calcium and phosphate: Parathyroid hormone, calcitonin, and active metabolites of vitamin D. Synthesis, functions and regulation.

Topic 42. Pancreatic hormones: Insulin, glucagon, somatostatin and pancreatic polypeptide. Synthesis, functions and regulation.

Topic 43. The adrenal gland. Hormones from the adrenal cortex: Mineralocorticoids, glucocorticoids and other steroid hormones. Hormones from the adrenal medulla: Adrenaline and noradrenaline. Synthesis, functions and regulation.

Topic 44. The pineal gland. Melatonin. Synthesis, functions and regulation.

X. Reproduction (12 h)

Topic 45. Physiology of the male reproductive system. Functions of testis: spermatogenesis and steroidogenesis. The hypothalamic-pituitary-gonadal axis. Actions of androgens. Functions of epididymis, vas deferens and accessory sex glands. Erection and ejaculation.

Topic 46. Physiology of the female reproductive system. Ovarian functions: oogenesis, folliculogenesis and steroidogenesis. The hypothalamic-pituitary-gonadal axis. Estrogens and progesterone effects. Effects of other hormones from the ovarium. Ovulation. The estrous cycle. Functions of oviduct, uterus and vagina.

Topic 47. Physiology of the female reproductive system in domestic animals. Estrous cycles. Seasonal variations.

Topic 48. Physiological changes in pregnancy. Hormones of pregnancy. Function of placenta. Parturition. Maternal and fetal mechanisms. Physiological induction of the parturition.

Topic 49. Physiology of lactation. Mammogenesis. Lactogenesis. Milk ejection. Galactopoiesis. Mammary gland involution.

Topic 50. Avian reproduction: ovarian hormones. Functions of oviduct. Ovulation and oviposition. Mating in birds.

B) Seminars

Four hours of seminars will be programmed in the classroom, and they will consist in:

- Collaborating with external professionals in order to study more in depth some topics, with special interest in practical aspects and with application in Physiology.
- Studying more in depth some topics of the program.

C) Practical program

It will consist in 34 hours of practical activities, distributed in 11 sessions.

Session 1. Electromyography. (3 h)

- **Practice 1.** Computer acquisition and analysis of the electrical and mechanical activity in the skeletal muscle.

Session 2. Study of the action potential. (3 h)

- **Practice 2.** Study of the resting membrane potential and the action potential in a nervous fiber through a simulation computer program.

Session 3. Sensorial physiology. (3 h)

- **Practice 3.** Sensitivity. Electrooculography and audiometry.

Session 4. Blood analysis I: Red blood cells. (3 h)

- **Practice 4.** Red blood cells count.
- **Practice 5.** Determination of hemoglobin concentration.
- **Practice 6.** Determination of hematocrit value.
- **Practice 7.** Determination of blood groups.

Session 5. Blood analysis II: White blood cells. Determination of proteins in plasma and serum (3 h)

- **Practice 8.** White blood cells count.

- **Practice 9.** Blood smear evaluation.
- **Practice 10.** Serum and plasma preparation. Total proteins determination in serum and plasma. Determination of concentration of albumin, globulins and fibrinogen.

Session 6. Electrocardiogram, blood pressure and arterial pulse (3 h)

- **Practice 11.** Electrocardiography and arterial pulse in humans and dogs.
- **Practice 12.** Measurement of blood pressure and blood flow in dog using a Doppler ultrasound system.

Session 7. Blood pressure and physiology of the blood vessels (3 h)

- **Practice 13.** Study of the physiology of the blood vessels and the control of blood pressure using an interactive computer program.
- **Practice 14.** Measurement of blood pressure using a sphygmomanometer.

Session 8. Intestinal absorption of carbohydrates and the estrous cycle in the rat. (4 h)

- **Practice 15.** Study of the intestinal absorption of glucose in anesthetized rat.
- **Practice 16.** Study of the estrous cycle in the rat. Vaginal cytology.

Session 9. Respiratory function. (3 h)

- **Practice 17**. Spirometry. Study or respiratory cycle

Session 10. Analysis of the urine and biochemical determinations in plasma and serum. (3 h)

- **Practice 18.** Qualitative analysis of the urine. Study of the urinary sediment.
- **Practice 19.** Biochemical assays: urea and creatinine.
- **Practice 20.** Biochemical assays: glycaemia.
- **Practice 21.** Biochemical assays: bilirubin and alanine aminotransferase (ALT).

Session 11. Exercise physiology. (3 h)

- **Practice 22.** Study of the physiological adaptations to exercise using an interactive computer program.

D) Clinical cases:

- Session 1 (2 h). It will be done at the beginning of the second semester.
- Session 2 (2 h). It will be held at the end of the second semester.

Course planning and calendar

Calendar of attendance sessions and presentation of works

The schedule and events of this subject are described in detail with the remaining subjects of the Degree of Veterinary Medicine, in the web page of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/). This link will be updated at the beginning of each academic course.

Bibliograpy

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28408

Universidad Zaragoza

Year : 2018/19

28409 - Microbiology and Immunology

Syllabus Information

Academic Year: 2019/20

Subject: 28409 - Microbiology and Immunology

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 9.0

Year: 2

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The Degree in Veterinary Medicine aims to train professionals in Veterinary Medicine (diagnosis, prognosis, treatment and prevention of diseases affecting domestic animals), Animal Production and Health (breeding and health of production animals, marketing of animal products for human consumption) and Hygiene, Safety and Food Technology (control of the food production chain, advice to food companies). The **general objective** of the subject of Microbiology and Immunology is to ensure that students acquire training in basic Microbiology and Immunology, which is necessary for understanding the other specific subjects of the Degree. The aims of this course are to:

- Distinguish the types of microorganisms involved in the processes referred to in the matter. Students should be able to distinguish bacteria viruses, fungi, as well as infectious proteins (prions); and within each category, their main types/strains (e.g., Gram-positive and Gram-negative bacteria).
- Know the elementary characteristics of each type of microorganism. Students must know the structure, elemental composition, metabolism, physiology, genetics, ecology, pathogenic power or virulence and way of life of each microorganism.
- Develop knowledge about Microbiology in its branches of Bacteriology, Virology and Mycology, both at a general and special level, with a marked interest in the pathology of domestic animals and its subsequent application to diagnostic techniques in infectious diseases as well as Food Microbiology and Environmental Microbiology.
- Understand and apply the basic safety rules for working with microorganisms. Students should be aware of the risks, precautions and measures to be taken when working with microorganisms, both in the laboratory and outside it (farms, industrial facilities, sampling, etc.).
- Perform basic manipulations of microorganisms in the laboratory, including fundamental tests of identification, culture and isolation. Students in the laboratory should be able to operate the optical microscope freely, perform staining, in vitro cultures, etc.
- Know the implications and consequences of the presence or absence of a microorganism in the environment or in the process in question. Students should be able to distinguish the effects produced by microorganisms: disease, degradation of substances, synthesis of substances (antibiotics, metabolites of interest), metabolic processes, etc.
- Assess the possibilities of preserving or altering the different populations of microorganisms in a system, depending on their effects. The aim is for students to know the possibilities of acting in favour (nutrients, cofactors, etc.) or against micro-organisms (antibiotics, antifungals, antivirals, physical and chemical means, etc.) and to be able to decide between alternatives.
- Acquisition of basic concepts, both theoretical and practical, that allow the student to know the components, mechanisms and fundamentals of the immune system of living beings, as well as the alterations coming from

a disorder of this system.

- Know how to use the information sources of Microbiology and Immunology and critically judge the information they contain. Students should be able to look for information and value it, knowing the credibility of the sources as well as the authors.

Context and importance of this course in the degree

The subject is closely linked to the subjects: General and Propaedeutic Pathology I and II, General Pathology, Integration in ruminants, Integration in birds and rabbits, Integration in companion animals, Integration in aquatic and exotic animals, Integration in equids, Integration in pigs, and Zoonoses, Preventive Medicine and Health Policy of the Clinical Sciences and Animal Health Module; with the subjects of Food Technology and Hygiene, Food Inspection and Control of the Hygiene, Technology and Food Safety Module and with the optional subjects of Ecology and Environment, Wildlife and Bee Production and Health. It is also closely linked to basic subjects such as Biology and Biochemistry, Genetics, Cytology and Histology and Physiology.

Recommendations for taking the course

This subject, of common basic training, is of a fundamental and transversal nature for other degrees and degrees that will give access to a large number of university master's degrees related to Animal Health, Human Health, Food Safety, Industrial Processes related to micro-organisms and the Environment.

Microbiology, as well as its different branches (Bacteriology, Virology, Mycology and Prions), both at a general and special level, is important in the fields of Animal and Human Health. It is basic to the process of diagnosis of infectious diseases of domestic animals, for the mechanisms of alteration of food, food processing processes and environmental contamination. It also has a direct relationship with Human Health, in terms of the existence of communicable diseases (zoonoses), toxinfections and food poisoning.

Immunology is a broad branch of biology and biomedical sciences, with applications in numerous scientific disciplines.

Microbiological diagnosis encompasses all procedures and complementary techniques used to establish the aetiology responsible for an infectious disease, food poisoning or environmental contamination.

Due to the high theoretical load of this subject, a constant effort on the part of the student is recommended, participating actively in both theoretical and practical classes.

Competences and learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Isolate and identify the microorganisms associated with the different pathological processes that affect animals as well as those that intervene in the deterioration of food and those related to the environment.
2. Know and interpret the fundamentals of microbiological and immunological diagnostic methods.
3. Organizational capacity, autonomous work planning and information management.
4. Critical reasoning capacity (analysis, synthesis and evaluation).
5. Ability to apply theoretical knowledge to situation analysis, problem solving and decision making in real contexts.
6. Ability to communicate correctly and effectively, orally and in writing.

Learning outcomes

If students complete the course successfully, they should be able to

1. Know, from the basic point of view, the microorganisms under study in the different branches of Microbiology, both those that affect Animal and Human Health and those that have an industrial, food, biotechnological or ecological application.
2. It adequately defines and uses the scientific terminology used in Microbiology.
3. Differentiate microbial diversity from the systematic, physiological and ecological points of view.
4. Define mechanisms used by microorganisms in their metabolism to develop their activities.
5. Interpret what mechanisms exchange genetic information between them and what this exchange of information brings to them.
6. Know the characteristics of microbial growth and the alternatives for its control.

7. Know the importance of the mechanisms of pathogenicity, virulence factors that microorganisms possess, since they are agents that produce diseases in animals and humans.
8. Differentiate and assessing the most common sterilisation and hygienisation techniques.
9. Acquire basic knowledge of the fundamentals of the immune system of living beings.
10. Know the basic components of the Immune System.
11. Know the mechanisms involved in immune responses, as well as the alterations resulting from a disorder of that system.
12. Know the immune responses that develop specifically against different microorganisms.
13. Know the specific surveillance systems of the immune system, such as antitumor, aging, transplant rejection.
14. Plan microbiological analyses and immunological diagnostic techniques, propose methods to be used, acquire the ability to carry them out and interpret the results.
15. Work as a team, synthesize available information on a subject, present and substantiate his opinion on the subject and present it publicly and orally.

Importance of learning outcomes

The Livestock, Agriculture, Fishing and Food sectors represent a very important part of the economy of a country, and offer employment to university graduates in the veterinary field. For this type of professionals, knowledge of Microbiology and Immunology is essential, given the importance of microbial processes in the health of animals, plants, fish and human food (Public Health).

On the other hand, the strengthening of generic or transversal competences of an instrumental, interpersonal and systemic type will contribute, together with the rest of the subjects, to the integral formation of future Veterinary Graduates.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

EVALUATION ACTIVITIES

The proposed activities will take place on the dates indicated in the examination schedule drawn up by the centre (global evaluation). Obtaining a score of 5 out of 10 in these tests will result in passing these contents.

Final written evaluation test consisting of multiple choice questions on the knowledge of General Microbiology, Immunology and Microbiological Diagnosis. Passing this test will accredit the achievement of learning outcomes 1, 2, 3, 4, 5, 6, 7, 8 and 9,10,11,12,13,14 and 15, and will be assessed following the criteria and requirement levels specified in section 7. The grade will be from 0 to 10 and this will represent 60% of the student's final grade in the subject. It will take place on the dates of examinations determined by the Centre. Guidance materials for the preparation of written tests will be available in the subject's ADD. In addition, and on a voluntary basis, part of this written test (corresponding to topics 1-27 of Microbiology and General Bacteriology; Special Bacteriology and Mycology) will be called on the dates assigned by the Centre (examination calendar).

Written test for the evaluation of laboratory practices

This test will consist of short questions and a case study. Passing this test will accredit the achievement of all the learning outcomes set out in this guide and will be assessed against the specified criteria and requirement levels. The grade will be from 0 to 10 and this grade will be 30% of the student's final grade in the subject.

For those students who have not attended any of the practical sessions, they will have to take an additional practical laboratory test coinciding with the celebration of the global test.

Group work It will consist of carrying out a work that integrates the theoretical and practical knowledge acquired during the course. The practice groups can choose between two options:

1. Carrying out a work to review the issues related to Applied Microbiology (Soil, Air, Water and Food) or with the identification of microorganisms as the basis for microbiological diagnosis, with serological diagnostic tests, etc.

2. Performing a microbiological research work in the laboratory.

Passing this test will prove the achievement of learning outcomes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.11, 12, 13, 14, 15 and 16 and will be evaluated according to the criteria and specified levels of requirement. The grade will be from 0 to 10 and this grade will represent 10% of the student's final grade in the subject. Students who submit to a single global test on

the dates determined by the center for examinations may only carry out modality 1 (review work) individually (after assignment of the subject by the responsible teacher), and must present it orally immediately after of the written evidence. The groups will consist of approximately 5 students. At the beginning of the course and in the program of the subject, the elaboration guidelines and the presentation format of the work will be marked.

The work will be exhibited and defended by each group in seminar-type sessions. The authors will explain and argue the points contained in the work and should discuss and discuss them with the rest of those present (teachers and students). The time available for the presentation and defend of the topic during the seminar sessions will be 15 to 20 minutes.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4.9: FAIL.

5.0-6.9: PASS

7.0-8.9: GOOD (NT).

9.0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The process of learning is based on:

The course is divided into 60 one-hour participatory lectures, 1 hour of seminars in which students prepare the subject in small groups, expose and respond to questions, and 30 hours of laboratory work.

Documentation for each topic is hosted within the Moodle 2 platform, under the name of the course. Thus, the student can access to it whenever s/he wants along the academic year. The available material consists of a comprehensive set of Power Point notes including all the basic concepts reviewed during the lecture. Student participation will be encouraged during the lecture through problem-based learning activities.

Laboratory practices (Microbiology 1-6) will be carried out in 1.5-hours sessions, duplicated in next day. Moreover, Laboratory practices (Immunology 1-5) will be carried out in 2.5-hours sessions. As for the lecture materials, supporting laboratory documentation will be host within the Moodle 2 platform.

In order to maintain permanent contact with students, both the use of electronic mail and personal tutorials are available. In addition, all available supporting material either for individual or group work (seminars) will be provided to the students.

Learning tasks

To achieve the expected results the course program includes the following activities:

THEORETICAL AGENDA

The lectures correspond to 60 hours. They cover the following topics, classified into three parts of the subject:

A) GENERAL MICROBIOLOGY AND B) MICROBIOLOGICAL DIAGNOSTIC

General Descriptors for A and B:

Prokaryotic and eukaryotic organisms. Microscopic examination of bacteria. Chemical bacterial composition. Bacterial physiology. Bacterial nutrition. Bacterial reproduction. Bacterial genetics. Factors produced by bacteria. The control of bacterial populations. Bacterial identification. Bacterial taxonomy. Fungi.

Competences:

The aim of these two first parts of the subject is to acquaint the student with the general characteristics of bacteria, viruses and fungi within the microbial world, their taxonomic status, constitution, observation methods, management, metabolism, mechanisms for exchanging information and their influence in relation to food and animals.

Teaching-learning activities:

Lectures: 36 hours (General Microbiology) and 4 hours (Microbiological Diagnostic)

Laboratory session: 18 hours of laboratory work (microorganism management and identification)

Regarding the blocks in which the contents of the first part of the course is presented are:

A) GENERAL MICROBIOLOGY

- **BLOCK I. GENERAL MICROBIOLOGY AND MICROBIOLOGICAL TECHNIQUES AND TOOLS**: Current concept and historical evolution. Diversity of the microbial world. Microbiology in the current scientific context. Division of Microbiology. Microscopic examination of bacterial and fungal microorganisms.

- **BLOCK II. GENERAL BACTERIOLOGY**. Bacterial taxonomy. Bacterial structure and Anatomy. Chemical bacterial composition. Bacterial physiology. Bacterial nutrition. Bacterial reproduction. Bacterial genetics. Factors produced by bacteria. The control of bacterial populations. Bacterial identification. Bacterial biology. Toxinogenesis.

- **BLOCK III. SPECIAL AND TAXONOMIC BACTERIOLOGY**: Different bacterial groups. Microorganisms involved in Animal Health and Public Health.

- **BLOCK IV. GENERAL AND TAXONOMIC MYCOLOGY**: The aim of this second block is to acquaint the student with the general characteristics of fungi, its constitution, methods of observation, management, metabolism, mechanisms for exchanging information and their role in relation to the animals. Fungi that produces deep, superficial and subcutaneous mycoses. Mycotoxins and mycotoxicosis.

- **BLOCK V. SPECIAL AND TAXONOMIC VIROLOGY**. Concept and historical development. Nature and structure of viruses. Viral classification. Viral genetics. Methods of study of viruses. Replication of animal viruses. Techniques for virus cultures. Bacteriophages. General Clinic presentations of viral infections. General methods of diagnosis for virus diseases. Viral inactivation. DNA viruses and RNA viruses.

- **BLOCK VI. PRION**: Prion concept. Properties of prions. Replication. Bovine Spongiform Encephalopathy. Scrapie.

B) MICROBIOLOGICAL DIAGNOSIS (B):

- **BLOCK VIII. MICROBIOLOGICAL DIAGNOSTIC:** The experimental disease and microbiological techniques: Laboratory animals (study and use). Basic rules for the collection and transport of pathological microbiological samples. Safety in the microbiology laboratory. Methods Gram and Ziehl-Neelsen. Biochemical tests for bacterial identification. Antibiotic sensitivity test. Polymerase chain reaction. (PCR) in Microbiology. Methods of study of fungi. Virus: Observation techniques, culture, isolation and identification. Methods of study of viruses. Haemagglutination and Haemadsorption. Virus titration. General methods of diagnosis of virus diseases. Inhibitors of viral replication. Viral inactivation. Immunological tests for the diagnosis of animal diseases. Immunoreactions: Agglutination and precipitation. Immunofluorescence reactions: fundaments and techniques. Enzyme immunoassays. Vaccine development.

C) IMMUNOLOGY General descriptors:

Basic principles and applied of the immune response, with special emphasis on the innate and acquired mechanisms involved in the immune response against microorganisms of veterinary clinical significance, on the techniques performed for diagnosis, on immunopathology and finally, on immunoprophylaxis methods. Knowing the basics of the different biological agents of veterinary interest.

Competences:

The aim of this part of the course is that students will be able to perform basic techniques of immunological diagnosis to enable it to assess the state of general and specific immunity of an animal. Also, to be able to diagnose the most common diseases by using various general and instrumental techniques; and predict the immune status of an animal against a microorganism and its responsiveness to different kinds of immunogens.

Teaching-learning activities:

20 one-hour lectures

11 hours of laboratory work

120 hours of Autonomous work and study

- **BLOCK VIII. GENERAL IMMUNOLOGY**: History and current concept. Mechanisms of natural immunity. The inflammation. Acquired immunity. Characters of the antigenic molecule. Antigens and Major Histocompatibility Complex. Immunocompetent cells. Lymphoid organs. Antibodies. Immunoglobulins. Antibody synthesis. The complement.

- **BLOCK IX. IMMUNOPATHOLOGY**: Immune system disorders. Hypersensitivity reactions. Autoimmunity. Immunodeficiencies.

- **BLOCK XI. IMMUNE RESPONSE AGAINST MICROBIAL AND PARASITIC ANTIGENS**: bacterial, viral, fungal and parasite antigens.

- **BLOCK XII. IMMUNOLOGY NOT RELATED WITH MICROORGANISMS IMMUNITY AND OTHER LOCAL IMMUNOLOGICAL ASPECTS**: Immunity related with transplants. Tumour immunity. Local immune mechanisms.

- **BLOCK XII. EVALUATION OF THE IMMUNE RESPONSE**: Antigen-antibody interaction. Serological reactions.
- **BLOCK XIII. APPLIED IMMUNOLOGY**: Immunoprophylaxis. Serological prevention and serological diagnostic. Immunomodulation and immunosuppression. Allergies.

PRACTICAL SESSION

It has 30 hours of compulsory student attendance. They will be developed in the laboratories of the Microbiology and Immunology Unit, established groups in advance by the Secretariat of the Centre. The content of the practical sessions is as follows:

A) GENERAL MICROBIOLOGY AND B) MICROBIOLOGICAL DIAGNOSTIC

Six practice sessions will be held on two consecutive days and will last an hour and a half each day.

Session 1. Standards for working at microbiology laboratories. Common material and equipment. Equipment´s Cleaning and maintenance. Distribution of laboratory areas. Equipment sterilization and preparation of culture media. The handling of the optical microscope. Simple staining.

Session 2. Sampling. Culture of aerobic and anaerobic microorganisms on solid medium and broth. Plating techniques. Gram staining. Special staining. Microscopic observation of bacteria.

Session 3. Identification of bacterial microorganisms. Biochemical and physiological identification. Conventional systems, API galleries.

Session 4 Quantitative study of bacterial populations. Bacterial colonies counting by filtration. Environmental Microbiology: air sampling (gravimetric and volumetric techniques) and surface sampling.

Session 5. Systems for assessment the antimicrobial susceptibility. Techniques: plate (Kirby-Bauer method), minimum inhibitory concentration (MIC) and minimum bactericidal concentration (CMB). Bacterial genetics (bacterial transformation).

Session 6. Identification of fungi and yeasts.

B) GROUP WORK

Session 1. Seminar on tutored projects, presented by the students. Individual work: 5 hours spent reviewing the different topics in the seminars.

C) INMUNOLOGY

Five practical sessions (in the latter, seminars lasting 1hr develop), and will last 2h30 'will be held.

Session 1. Agglutination and precipitation techniques on serological reactions

Session 2. Immunofluorescence technique on serological reactions

Session 3. Microorganism identification through immunological reactions. This practice will be taught in English

Session 4. Vaccination principles. Immunization systems.

PERSONAL TUTORIALS

A fixed schedule for personal tutorials is not set, however professors will be available to students by appointment and through email.

Syllabus

LECTURES

A) GENERAL MICROBIOLOGY

Block I: GENERAL MICROBIOLOGY AND MICROBIOLOGY TECHNIQUES

Lecture 1. Introduction to Veterinary Microbiology.

Lecture 2. Microscopic examination of bacteria.

Block II: GENERAL BACTERIOLOGY

Lecture 3. Prokaryotic and eukaryotic organisms.

Lectures 4 and 5. Constant elements of bacteria.

Lecture 6. Inconstant elements of bacteria.

Lecture 7. Chemical constitution of bacteria.

Lecture 8. Bacterial physiology and metabolism for synthesis.

Lecture 9. Bacterial nutrition.

Lecture 10. Bacterial reproduction.

Lecture 11. Physical and chemical agents that act on the life of microorganisms.

Lecture 12. The genetic transfer phenomena.

Lecture 13. Bacterial and extra-bacterial factors.

Lecture 14. Toxin-genesis

BlocK III. SPECIAL AND TAXONOMIC BACTEROLOGY

Lecture 15. Bacterial taxonomy. Gram Negative Bacteria

Lecture 16. α-PROTEOBACTERIA and β-PROTEOBACTERIA.

Lecture 17. γ-PROTEOBACTERIA.

Lecture 18. ε-PROTEOBACTERIA.

Lecture 19. CHLAMYDIA, FUSOBACTERIA AND BACTEROIDES.

Lecture 20. SPIROCHETES.

Lectures 21 and 22. Low G+C Gram Positive Bacteria

Lecture 23. High G+C Gram Positive Bacteria

Block IV: SPECIAL AND TAXONOMIC MICOLOGY

Lecture 24. Mycology. General characteristics of fungi.

Lecture 25. Fungi that produces deep, superficial and subcutaneous mycoses.

Lecture 26.- Mycotoxins and mycotoxicosis.

Block VII MICROBIOLOGY DIAGNOSTIC

Lecture 27.- Bacteriology and Mycology Diagnostic. Case reports.

Block V: SPECIAL AND TAXONOMIC VIROLOGY and Block VII MICROBIOLOGY DIAGNOSTIC

Lecture 28.- General virology.

Lecture 29.- General Pathology of virus diseases.

Lecture 30.- Animal viruses replication.

Lecture 31. Bacteriophages.

Lectures 32 y 33.- DNA/2 and DNA/1viruses.

Lecture 34.- RNA/1 viruses (inverse transcriptase).

Lecture 35.- RNA/1 viruses (negative sense).

Lecture 36 and 37.- RNA/1 viruses (positive sense).

Block VI: PRIONS

Lecture 38.- Prions

B) INMUNOLOGY

Block VIII GENERAL INMUNOLOGY

Lecture 39.- Immunology. History and current concept. Types of immunity.

Lecture 40.- Mechanisms of the Natural Immunity.

Lecture 41.- Acquired Immunity: characteristics.

Lecture 42.- Antigen and Major Histocompatibility Complex. Blood types.

Lecture 43.- Immunocompetent cells. Myeloid and lymphoid lineages.- T and B lymphocytes.

Lecture 44.- Others immunocompetent cells: ADCC, NK cells, Citokines. Lymph organs.

Lecture 45.- Antibodies.

Lecture 46.- Domestic animals Immnunoglogulins.

Lecture 47.- Theories of antibodies synthesis.

Lecture 48.- Complement. System.

Block IX IMMUNOPATHOLOGY

Lecture 49.- Immune system disorders. Hypersensitivity reactions type I y II.

Lecture 50.- Type III and Type IV Hypersensitivity reactions. Inespecific Hypersensitivity reaction.

Lecture 51.- Autoimmunity. Immunodeficiencies.

Block X IMMUNE RESPONSE AGAINST MICROBIAL AND PARASITIC ANTIGENS:

Lecture 52.- Synthesis of microbial antigens and immunological mechanisms against infections of bacterial, viral, fungal and parasitic antigens.

Block XI INMUNOLOGY NOT RELATED WITH MICRORGANISMS. IMMUNITY AND OTHER LOCAL IMMUNOLOGICAL ASPECTS:

Lecture 53.- Immunity related with transplants. Tumors and aging related immunity.

Lecture 54.- Local immune mechanisms.

Block XII EVALUATION OF THE IMMUNE RESPONSE:

Lecture 55- Antigen-antibody interaction. Serological reactions.

BloCK XIII APPLIED IMMUNITY

Lecture 56.- Immunoprophylaxis.

Lecture 57.- Serological prevention and serological diagnostic.

Lecture 58.- Immunosuppression.

Block VII MICROBIOLOGY DIAGNOSTIC

Lecture 59.- Immunological tests for microbial identification.

PRACTICAL SESSIONS

A) GENERAL MICROBIOLOGY AND B) MICROBIOLOGICAL DIAGNOSTIC

Session 1. Standards for working at microbiology laboratories. Common material and equipment. Equipment´s Cleaning and maintenance. Distribution of laboratory areas. Equipment sterilization and preparation of culture media. The handling of the optical microscope. Simple staining.

Session 2. Sampling. Culture of aerobic and anaerobic microorganisms on solid medium and broth. Plating techniques. Gram staining. Special staining. Microscopic observation of bacteria.

Session 3. Identification of bacterial microorganisms. Biochemical and physiological identification. Conventional systems, API galleries.

Session 4: Quantitative study of bacterial populations. Bacterial colonies counting by filtration. Environmental Microbiology: air sampling (gravimetric and volumetric techniques) and surface sampling.

Session 5. Systems for assessment the antimicrobial susceptibility. Techniques: plate (Kirby-Bauer method), minimum inhibitory concentration (MIC) and minimum bactericidal concentration (CMB). Bacterial genetics (bacterial transformation).

Session 6. Identification of fungi and yeasts.

B) GROUP WORK

Session 1. *Introduction to bibliographic search. Beginning of group work in Microbiology and Immunology.*

C) INMUNOLOGY

Session 1.- Agglutination and precipitation techniques on serological reactions Session 2.- Immunofluorescence technique on serological reactions

Session 3.- Microorganism identification through immunological reactions. This practice will be taught in English.

Session 4.- Vaccination principles. Immunization systems.

Session 5.- Seminar on tutored projects, presented by the students.

Course planning and calendar

The dates and key milestones of this subject are described in detail, along with the other subjects of the second year in the in the Faculty of Veterinary Medicine website

Planning MICROBIOLOGÍA subject in ECTS Credits: 9 ECTS (225 hours of autonomous work and study)

Students and groups: 150 students, two groups of theoretical teaching and 12/24 of practical teaching. Experimentally factor: 3

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28409

Universidad Zaragoza

Year : 2018/19

28410 - Genetics

Syllabus Information

Academic Year: 2018/19

Subject: 28410 – Genetics

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 2

Semester: First semester

Subject Type: Basic Education

Module:

General information

Aims of the course

The subject and its expected results respond to the following approaches and objectives:

Genetics studies heredity and the processes that lead species to be as it is and to variation within each species, since genes are the determinants of the inherent properties of each living organism.

The knowledge of Genetics is essential for the complete understanding of other disciplines in Veterinary Science: Anatomy, Biochemistry, Cytology, Microbiology, Pathology, Reproduction..... because the study of Genetics is carried out at molecular, cellular, organism, family, population and evolutionary levels.

The aims of this course are to:

- Know the fundamentals of Genetics and to know how to use the basic terminology related to genetic material.
- Know the principles that govern the inheritance of characters between generations.
- study the molecular bases of the structure, function and regulation of genes.
- Understand the causes of the genetic variation of living beings.
- Handle simple models of genetic analysis in the laboratory.
- Analyzing biological sequences by computer methods.
- Understand the fundamentals of constructing genetic maps and physical maps.
- Understand the basic mechanisms of genetic evolution.
- Know the characteristics that provide genetic balance in a population
- Analyze the factors that change the genetic structure of populations.
- Understand the genetic basis of the pathology of species of veterinary interest.
- Integrate the principles of genetics with the rest of the veterinary matters

Context and meaning of the subject in the degree

This course prepares students to know the bases of heredity and the processes that imply the transmission of hereditary traits, the bases of animal identification, the genetic support involved in reproduction, production and many of the pathologies presented by species of veterinary interest. And in short, the application of all this knowledge to your professional task as a veterinarian.

Recommendations for taking the course

In order to take this subject, it will be required to have acquired the competences of the first and second four-month term subjects of the Veterinary Degree, exclusively those referring to Biology and Biochemistry, Epidemiology and Biostatistics and Basic Sciences for Veterinary Medicine.

Competences and learning outcomes

Competences

After completing the course, the student will be competent in the following skills:

Generic transversal competences

- Ability to organize and plan
- Oral and written communication
- Elementary computer skills
- Skills for working in a group
- Skills to retrieve and analyze information from different sources
- Dexterity in the handling and interrelation of genetic concepts.
- Ability to interpret genetic facts or data
- Ability to propose and assess hypotheses

Specific competences

- Know the molecular and genetic bases of biological processes To know the nature, organization and replication of hereditary material
- Know the processes of cell differentiation, division and proliferation, information and genetic expression in cells. Know the principles of control and regulation of gene expression
- Describe and interpret changes in genetic material
- Identify and know the repair capacity of the hereditary material.
- Know the basic mechanisms that allow detecting and diagnosing genetic diseases in the main veterinary species.
- Interpret population dynamics from a genetic basis. Apply genetic concepts to real experimental situations.
- Handle the basic material and techniques of a genetics laboratory, including
- Acknowledge protocols for the purification, amplification and sequencing of genomic DNA from biological sources and the use of computer tools for genetic analysis.

Learning outcomes

If students complete the course successfully, they should be able to

1. Know the genetic bases of biological processes: nature, organization and replication of hereditary material, information and genetic expression in cells, differentiation and development, mutation and repair of hereditary material, population dynamics.
2. Describe and interprets the principles of transmission and recombination of **genetic** information across generations in both prokaryotes and eukaryotes.
3. Give genetic advice guiding in the interpretation of data in cases of genetic problems.
4. Identify and know the basic principles of genetic biotechnology and the processes of **genetic** modification in different organisms.
5. Manage the material and basic laboratory techniques: Recognizes with macroscopic methods, microscopic and imaging techniques, both the results of gene expression and the structural genetic material (chromosomes and DNA). It is capable of performing protocols for purification, amplification and sequencing

of genomic DNA from biological sources.

6. Use the necessary computer tools to carry out the genetic analysis.

Importance of learning outcomes

The student who has passed the course will be able to analyze the main mechanisms of inheritance in species of veterinary interest and the processes that originate the manipulation, selection and reproduction of hereditary traits. You can determine how inheritance is passed from one generation to the next, and how the characteristics that control these transmission processes are developed.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that achieved the intended learning outcomes through the following assessment activities:

(1) Written exams

An exam at the end of the term. It will take place according to a schedule approved by the Center Board. It will consist of three parts: multiple-choice questions, short answer questions and problems. The score for multiple-choice questions is 30%, the score for short questions is 30% and the score for problems is the remaining 40% of the exam grade. Test errors will not be scored with negative points.

The grade for this written exam will be 60% of the final grade.

Written examinations assess learning outcomes 1, 2 and 4.

(2) Oral Problem Solving Session

The correct resolution in public of the oral test of problems and the booklet with the solved problems, will suppose a 15% of the final grade. The absence or unsatisfactory explanation of a problem will mean the loss of the points. The mark obtained in this section will be saved for successive courses (with a maximum of 5 years) and if the student wishes to improve it, she/he will be allowed to join a group in the chosen course.

This test evaluates learning outcomes 1 and 3.

(3) Seminar sessions and group work

Both the level of the presentation and the presentation (clarity, ability to communicate and discuss the results, etc.) will be scored. It will be graded with 15 % of the final grade. The mark obtained in this section will be saved for successive courses (with a maximum of 5 years) and if the student wishes to improve it, he will be allowed to join a group in the chosen course.

This test evaluates learning outcomes 2, 3 and 4.

(4) Laboratory sessions and Computer Rooms

These sessions and examination will be graded with 10 % of the final mark. The mark obtained in this section will be saved for successive courses (with a maximum of 5 years) and if the student wishes to improve it, she/he will be allowed to join a group in the chosen course.

The practice exam will be written and will be carried out at the same time and in the same place as the end of term written exam, annexed to it.

This test evaluates learning outcomes 5 and 6. Final score

The final score will be the sum of all partial grades, provided the student obtains at least a 4 out of 10 written test score.

The scores obtained during the course in the activities described in sections (2), (3) and (4) will be maintained in the 2nd session of the same course for those students who have not passed the subject in the 1st session, in addition to the fact that the mark obtained in sections 2, 3 and 4 will be saved for successive courses (with a maximum of 5 years). In the event that the student wishes to improve it, he/she will be allowed to join a group in the chosen course.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Tests for students who are not present or those who present themselves in other session but first.

A final exam that will include:

Theory exam: A test (graded 30% of the final grade) and short questions, graded another 30% of the final grade.

Examination of Problems: will be graded with 40 %.

Errors in the test will not be graded with negatives and the final grade will be the sum of the grades of each test performed. These tests are used to assess learning outcomes 1 to 6.

Learning process designed for this subject is based on:

The theoretical knowledge of principal concepts of Genetics, but also on their practical applications to livestock species. Planned practice are intended to put in touch with reality by means of observation and direct handling of genetic material, both in laboratory and in field.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process designed for this subject is based on the theoretical knowledge of principal concepts of Genetics, but also on their practical applications to livestock species. Planned practice are intended to put in touch with reality by means of observation and direct handling of genetic material, both in laboratory and on field

Learning tasks

1. Theoretical sessions.

Attendance hours: 30.

Non-attendance hours: 45.

Teaching and learning methodology:

Lectures are complemented by graphics and schemes from PowerPoint presentations and development of ideas on the blackboard. Previously, graphic material is at the disposal of the students from both ADD and Copying Service of the Faculty. Students questions and discussions about genetic subjects are encouraged.

2. Laboratory sessions.

Attendance hours: 16.

Non-attendance hours: 0.

Teaching and learning methodology: Practical activities consist of conducting an experiment about genetic analysis during eight two-hour sessions in the student laboratory of the Area of Genetics and in the Computer classroom. Each student will elaborate a laboratory booklet about session's methodology and answer to teacher's questions.

3. Problems sessions.

a) Classroom sessions the two groups of students.

Attendance hours: 12.

Non-attendance hours: 18.

Teaching and learning methodology:

Problems relative to subjects exposed during theoretical sessions (one hour/week). Collections of problems are at the disposal of the students from both ADD and Copying Service of the Faculty. The teacher solves several problems, as examples for improving student's comprehension of genetic subjects.

b) Problems for the students' teamwork.

Non-presential hours: 13.

Teaching and learning methodology:

Problems different to those solved in classroom are given in advance to students' teamworks. At the end of course, every student in these teamwork will participate in a public session for the presentation, discussion and resolution of the problems, where all teachers involved in problems sessions will be present.

4. Seminars.

Attendance hours: 2.

Non-attendance hours: 10.

Teaching and learning methodology:

Public presentation of works elaborated by students' teamwork. Complementary activity for dealing with subjects not taught previously.

Table summary of teaching-learning activities

ACTIVITY	PRESENTIAL HOURS	FACTOR	NON-PRESENTIAL HOURS *	TOTAL
Theoretical sessions	**30**	**1.5**	**45**	**75**
Problems sessions in classroom	**12**	**1,5**	**18**	**30**
Laboratory and computer sessions	**16**	**-**	**-**	**16**
Seminars	**2**	**5.0**	**10**	**12**
Evaluations	**-**	**-**	**4**	**4**
Problems for the students' teamwork	**-**		**13**	**13**
Total	**60**	**1.5**	**90**	**150**

- **According to regulations of the Universidad de Zaragoza**

Summary of hours of student dedication for each activity

Activity	Hours
Presential (Theoretical , problems and laboratory sessions, seminars)	**60**
Authorized non-presential (Evaluations)	**4**
Non-presential (personal study, bibliographic consultation)	**86**

Total: 150 hrs

Syllabus

Theoretical sessions

BLOCK 1. **STRUCTURE AND ORGANIZATION OF THE HEREDITARY MATERIAL (1 week).**

Topic 1. Nature of the hereditary material.

Topic 2. Replication.

GENETIC TRANSMISSION (2 weeks).

Topic 3. Chromosome theory of inheritance.

Topic 4. The mendelism as a genetic consequence of meiosis and fertilization.

Topic 5. Complex mendelism. Applications in the detection and diagnosis of diseases of genetic origin in livestock species.

Topic 6. Inheritance and Sex. Applications in the detection and diagnosis of diseases of genetic origin in livestock species.

BLOCK 2. **LINKAGE AND RECOMBINATION** (1+ 1/2 weeks).

Topic 7. DNA recombination.

Topic 8. Linkage analysis of eukaryote genes. Double recombination. Complete linkage.

Topic 9. Recombination in prokaryotes. Gene structure.

KNOWLEDGE OF THE GENOME (1 week).

Topic 10. Making genetic and physic maps of livestock species.

Topic 11. Gene maps in prokaryotes. Bacterial and viral mechanisms that allow the development of gene maps.

BLOCK 3. **CHANGES IN HEREDITARY MATERIAL** (3 weeks).

Topic 12. Chromosome mutations. Structural variations of chromosomes.

Topic 13. Chromosome mutations. Numerical variations of chromosomes.

Topic 14. Chromosome abnormalities in livestock species and consequences on animal production and breeding.

Topic 15. Gene mutations. Applications in the detection and diagnosis of diseases of genetic origin in livestock species.

Topic. Mitochondrial DNA.

REPAIR OF HEREDITARY MATERIAL (1/2 week).

Topic 17. DNA repair.

BLOCK 4. **REGULATION AND CONTROL OF GENE EXPRESSION** (3 weeks).

Topic 18. Transcription. RNA maturation.

Topic 19. Translation, protein synthesis and gene code.

DEVELOPMENTAL GENETICS (1/2 week).

Topic 20. Development genetics.

BLOCK 5. **GENE BIOTECHNOLOGY** (1 + 1/2 weeks).

Topic 21. Recombinant DNA technology.

Topic 22. DNA analysis. Applications to animal production, improvement and breeding.

BLOCK 6. **POPULATION GENETICS** (3 weeks).

Topic 23. Basic concepts about population genetics. Characterization of populations.

Topic 24. Deviation from Hardy-Weinberg equilibrium I: systematic factors.

Topic 25. Deviation from Hardy-Weinberg equilibrium II: dispersive force.

Laboratory sessions program:

Session 1. Cytological basis of inheritance, observation and identification of phases of the cell cycle.

Session 2. DNA extraction.

Session 3. Sex diagnosis by DNA testing in livestock species.

Session 4. Chromosome abnormalities in livestock species. Karyotipes.

Session 5. Cell culture.

Session 6. Mutagenesis. Detecting DNA modifications.

Session 7. Restriction maps. Cloning and subcloning of DNA sequences by using several softwares.

Session 8. Study of gene variation by electrophoretic techniques. Estimation of genotype and allele

frequencies. Hardy-Weinberg equilibrium in a population.

Basic security rules for laboratory sessions:

- Mandatory use of the robe.
- Use in various sessions of splash-proof safety goggles.
- In sessions that require safety glasses, optical contact lenses may not be used.
- Except for very short hair, it is necessary to use a cap or a system that collects and holds the hair.
- Any other safety requirement that teachers consider necessary in particular sessions.

Problem sessions program:

1. Monohybridism. Crosses between lines differing in a single character. Dominant and non-dominant genes.
2. Complex mendelism. Lethal genes.
3. Analysis of genealogies.
4. Sex-linked inheritance.
5. Linkage and recombination.
6. Linked genes and gene maps in eukaryotes.
7. Gene maps in prokaryotes.
8. Structural chromosome abnormalities.
9. Variations of chromosome number.
10. Gene characteristics of populations and Hardy-Weinberg equilibrium.
11. Changes in allele frequencies I.
12. Changes in allele frequencies II.

Course planning and calendar

Dates and key milestones of the subject are described in detail, along with the rest of the subjects of the second course in the degree of veterinary medicine, on the website of the Facultad de Veterinaria (link: http://veterinaria.unizar.es/gradoveterinaria/). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28410

Universidad Zaragoza

Year : 2018/19

28411 - Agronomy

Syllabus Information

Academic Year: 2018/19 **Subject:** 28411 – Agronomy

Faculty / School: 105 -

Degree: **451 - Degree in Veterinary Science**

ECTS: 6.0

Year: 2

Semester: First semester

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The subject and its expected results respond to the following approaches and objectives:

The Order ECI/333/2008 lays out the competences to be acquired by students who take this subject

- Morphology, bionomy and systematics of (...) plants of veterinary interest.
- Feed materials: Characteristics, production and preservation.

The **general aim** of the course is the students´ acquisition of basic elements of judgment to act in the agrarian environment, in which a relevant proportion of graduates, including more clinical veterinarians, will develop their professional activity. On the other hand, a great part of the veterinarians of the public Administration develop their activity in the Agriculture and Environment Councils and, hence, they will need knowledge on the farmland. Other professional areas in which graduates will need knowledge provided by this course are related to feed manufacturing companies and whole mixed rations for ruminants, formulation of rations, etc.

Students, through this course, must acquire a broad and complete knowledge of the most relevant plant resources for animal feed, directly usable, or as raw materials for the processing of feeds. Livestock production systems cannot be well understood if they do not have a good knowledge on agricultural resources and the basis of their feeding which accounts for up to 80% of the production costs. In addition, many pathologies are linked to the misuse of grains and fodder.

Finally, future veterinarians must have a holistic, systemic and ecological vision of further knowledge that they will acquire throughout their training. This course contributes to that vision.

Context and importance of this course in the degree

The teachings of **Agronomy** have occupied, under several denominations, an important place in the study plans of Veterinary Medicine in Spain and other countries **since the first Veterinary School** of the world (Lyon, 1762) and, of course, from the first Veterinary Schools of Spain (Madrid, 1792; Zaragoza and Córdoba, 1847). In the Plan of Studies of the new Degree in Veterinary Medicine of the University of Zaragoza (2010), the subject "Agronomy" is located in the 2nd Course (third semester) as a compulsory subject, between the **Common Basic Training** module and the **Animal Production** module. Our subject can be considered as a bridge-subject between some basic contents on animal and plant biology and more specialized subjects, providing the student with the acquisition of knowledge and concepts that must dominate in those disciplines: Animal Nutrition (4th semester), Toxicology (5th semester), Animal Production, Medical Pathology and Production Economics (7th and 8th semesters), Food Technology (9th semester), and in the optional subjects Bee Production and Health and Ecology and Environment, among others.

Recommendations for taking the course

Students must have taken all first-year subjects of the Veterinary Degree. If they have not passed any of these first-year subjects, they must be enrolled in.

It is **highly recommended** to attend classes regularly, as well as seminars, to do the proposed written essays, and to attend tutorials throughout the course.

Competences and learning outcomes

Competences

On successful completion of this course, students will be able to

1. Manage a set of concepts, information and terms that will allow you to develop correctly with professionals of the agrarian and natural environment (farmers, agronomists and forest engineers, biologists, ecologists, graduates in Environmental Sciences, geographers, civil servants of the Administration, staff of the Regional Agro-environmental Offices, etc.).
2. Asses the contribution of farming systems to the conservation of the natural environment and to the economic and social sustainability of the agricultural environment.
3. Classify, differentiate and assess the nutritional value of different types of feeds and raw materials for animal feeding.
4. Use properly scientific nomenclature.
5. Observe and detect morphological and anatomical differences and analogies between different types of plant types.
6. Interpret data tables. Formulate results and express them correctly.
7. Work in the laboratory.
8. Work as a team.
9. Analyze the information critically. Analyze and synthesize information.

Learning outcomes

If students complete the course successfully, they should be able to

1. Indicate the nutritional value, as well as the limiting factors of use, and the correct conservation of the main plant resources for animal feeding. As well as to indicate broadly the geographical distribution, agronomic characteristics, ecology and production of the main plant species cultivated for animal feeding.
2. Analyze and explain the interactions between the components of the agro-pastoral ecosystems: climate, soil, plants, animals. To recognize the importance of agriculture in the production of feeds for animals and to analyze the multifunctionality of the pastures, rangelands and livestock farming systems linked to the land – mainly ruminant systems- in the conservation of the environment.
3. Analyze and explain the relationships between the plant cell components, tissues types, organs and plant nutritional principles for animal feeding.
4. Distinguish the main plant resources for animal feeding: cereals and grain legumes, fodder, by-products, crop residues, and to distinguish some toxic rangeland species.
5. Describe and follow standardized food chemical analysis protocols. And to express and interpret the results obtained in the laboratory in standardized units. You must also demonstrate that you are familiar with the laboratory work and instrumentation to perform these analysis techniques.
6. Describe the main procedures for preserving food for animal feeding. And to make an organoleptic assessment of several conserved forage, including silage and hay feeds.
7. Classify and define different types of pastures and the main livestock farming systems associated with them.

Importance of learning outcomes

This subject contributes, together with the rest of the competences acquired through the subjects of the Modules of Common Basic Formation and of Animal Production, to enable students to carry out their profession in the **agrarian environment**, in the **Public Administration**, and in general in all those companies that are related to animal feeding.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Type of tests

1 **Written test for the assessment of theoretical knowledge**: theoretical knowledge will be assessed by means of a written test that will consist of 35 to 50 multiple-choice questions, each with five possible alternatives and only one right answer. They shall be graded as follows: 1 point for each question answered correctly, 0.25 negative points for

each wrong answer and 0 points for each question not answered. In order to pass this test, the student must obtain at least 50% of the total points.

The mark for this test will only be considered for the final mark if the written tests of practical knowledge have also been passed.

The theoretical part will be 60% of the final grade.

2 **Written test for practice sessions assessment**: For the assessment of the lab sessions, there will be 3 written tests of the knowledge acquired in three types of practice. These tests will be performed a few days after the corresponding practice has been carried out and will consist of: for the AGRO-1 and AGRO-3 practices, an examination of problems and multiple choice questions, with similar characteristics and assessment to those of the theoretical knowledge tests. For the AGRO-2 practice they will consist of the identification of a set of raw materials, products, by-products and crop residues plant origin for animal feeding.

The overall rating of the three practices is an average of each of them, where it is necessary to obtain at least a 4 out of 10 in each type of practice so that its rating can be averaged. The internship rating is 24% of the final rating. Internships are passed with an overall score of at least 5 points out of 10.

The students who have not taken these tests or have not passed them during the course, can be examined of the three types of practices jointly in the official announcements, together with the theory tests.

The qualification of this test will only be considered for the final mark if the written test of theoretical knowledge has been passed.

The qualification of practices will be maintained in official announcements other than the first.

3 **Works (in teams of two students)**: Written (with 60%) and oral (with 40%) presentation will be assessed. It will be delivered in writing and defended in public. The clarity and precision in the use of the language, the relevance of the contents, the capacity of synthesis, the adjustment to the time established for the presentation and the quality of the bibliography used will be assessed, among other topics.

The grade of this work will be 10% of the final grade and will only be considered for the final grade if students have passed the written tests of theoretical and practical knowledge.

The qualification of the work will be maintained in official calls other than the first.

4 **Tests in class throughout the semester on theoretical content of the subject**: These tests will take place during theory classes, with all the study material available to the student (notes, slides, etc.) and without prior notice from the teacher. They will consist of various types of exercises related to the theory session being taught: true/false test questions, problem solving, interpretation of tables and graphs, short questions, or other types of exercises. These tests will be given in class to the teacher.

The grade on these tests will be averaged and that average will together account for 4% of the final grade. It will only be considered for the final mark if the written tests of theoretical and practical knowledge have been passed.

The qualification of these tests will be maintained during the current year in official announcements other than the first, but not in successive courses.

5 **Issues related to guest speaker seminars**: Students will formulate and submit at least two relevant questions in relation to the seminars given by guest speakers. These questions will be given to the teacher at the end of the seminar, will be assessed according to their relevance and clarity of expression, and will represent 2% of the final grade of the subject.

The qualification of this activity will only be considered for the final mark if the written tests of theoretical and practical knowledge have been passed.

The qualification of these tests will be maintained during the current year in official sessions other than the first.

Evaluation criteria and requirement levels

1. To pass the subject, the theoretical knowledge grade must be 5 out of 10 or higher, and the rating of the internship must also be 5 out of 10 or higher.
2. In order to pass the internship, it is also necessary to obtain at least a 4 out of 10 in each type of internship so that your grade can be averaged.
3. The final grade will be obtained by means of a weighted average of all the evaluation activities with the following values: the theoretical part will contribute 60%, the practical part 24%, the work 10%, the exercises in class 4% and the seminars 2%. Work grades, class exercises and seminars will only be considered if written tests of theoretical and practical knowledge have been passed.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

The "Honorable Matriculation" may be awarded to students who have obtained a grade equal to or higher than 9'0. Their number may not exceed five percent of the students enrolled in the corresponding academic year.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process is structured around 40 lectures of 50 minutes each, 17 hours of laboratory work (in four types of practices), 1 hour of workshops, and one written/presented essay of the student. Globally, there are 150 hours of work of the student, including (60 face-to-face sessions).

The lectures will develop the theoretical concepts of the Programme. The lectures presentations will be available in the Official Reprography Service of the Veterinary Faculty and the Digital Teaching Web (ADD). Teaching resources not provided by the Official Services of the University are not responsibility, and are not edited or revised by the teaching staff. The evaluation process will be done exclusively on the contents of the present course.

An outline of the practice sessions will be provided to the students. The security measures in the laboratory are the following:

GENERAL SECURITY GUIDELINE IN THE LAB

- Bring the practice sessions outline to the laboratory

-Wear appropriate clothes to avoid contact with chemical products: bring laboratory coat and wear it appropriately settled; wear lab goggles and appropriate shoes

-In case of any kind of allergy, the student has to inform the teacher responsible of the practice

-Do not wear contact lenses

-Eat and drink are not permitted in the lab

All the attendees have to be aware of the general information provided by the UPRL http://uprl.unizar.es/estudiantes.html

Learning tasks

Learning tasks consist of: lectures, laboratory practical sessions, guest speakers conferences and workshops, and written and presented essays.

Learning activities (abstract)

Activities	Face-to-face sessions (h)	Student autonomous work (h)	Total
Lectures	40	55	95
Workshops	3		3
Laboratory tasks	17	15	32
Written/presented essay		20	20
Total	**60**	**90**	**150**

Syllabus

Topic 1. Agriculture, Agronomy, Plant breeding, Livestock breeding. Historical origins. Importance of the Agricultural Sector. Interactions between Plant Breeding, Livestock breeding, Human and Animal feeding.

Learning Activities:

Lectures, 3 hours.

Topic 2. Agroecology. Agroecosystems, Agri-Livestock Ecosystems, Agroforestry. Agricultural systems. Mixed crop-livestock systems. Trophic and energetic fluxes in Agroecosystems. Ecosystem Services. Climate and Soils as Agroecosystems and Plant Production factors. Organic farming. Nutrients and iis interactions in soil-plant-animal subsystems.

Learning Activities:

Lectures, 5 hours.

Topic 3. Agricultural techniques related to the use of water, soil fertility and crops.

Learning Activities:

Lectures, 2 hours.

Topic 4. Chemical and Bromatological Assessment of plant resources for Animal feeding. Feeds classification. Botany and Animal feeding. Main botanical Families in Animal feeding.

Learning Activities:

Lectures, 3 hours.

Practical work AGRO1, 5 hours. Chemical and Bromatological Assessment of plant resources for Animal feeding. Weende analysis.

Topic 5. Energetic concentrate feeds: cereals, roots and tubers, agrifood industry energetic by-products. Learning Activities:

Lectures, 6 hours.

Practical work AGRO2, 5 hours. Cereals, roots and tubers, agrifood industry by-products identification.

Topic 6. Concentrate protein-rich feeds: cakes and meals, pulses, agrifood industry protein-rich by-products. Learning Activities:

Lectures, 6 hours.

Practical work AGRO2, 5 hours. Concentrate protein-rich feeds: cakes and meals, pulses, agrifood industry protein-rich by-products identification.

Topic 7. Concentrate feeds types. Concentrate feeds production technology.

Learning Activities:

Lectures, 1 hour.

Practical work AGRO2, 1 hour. Raw components and Concentrate feeds types.

Topic 8. Energetic and protein-rich feeds for beehives. Melliferous flora and natural vegetation, Melliferous crops. Learning Activities:

Lectures, 1 hour.

Topic 9. Grass and forage Science. Multifunctionality of grasslands and livestock farming. Worldwide natural and cultivated grasslands.

Learning Activities:

Lectures, 3 hours.

Topic 10. Forage conservation systems: hay-making, silage, dehydration processes. Learning Activities:

Lectures, 1 hour.

Practical work AGRO3, 2 hours. Forage conservation systems.

Topic 11. Grass and legume grasses. The alfalfa. Learning Activities:

Lectures, 5 hours.

Practical work AGRO2, 2 hours. Grass and legume grasses identification.

Topic 12. Grazing and Ecosystem Services. Stocking rates. Water. Grasslands Toxic species. Transhumance and Transterminance. Grass and forage scheduling.

Learning Activities:

Lectures, 5 hours.

Practical work AGRO2, 1 hour. Grassland toxic species identification.

Topic 13. Low nutritional quality feeds: crops and agrifood residues. Other feeds: unifeeds, whole mixed rations for ruminants.

Learning Activities:

Lectures, 1 hour.

Other learning tasks -essays and workshops with guest speakers- are related to several topics.

Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course please refer to the Veterinary Faculty Web site (http://veterinaria.unizar.es/gradoveterinaria/) and to the ADD site (http://add.unizar.es/add/campusvirtual/).

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28411

Universidad Zaragoza

Year : 2018/19

28412 - Laboratory Animal Science - I

Syllabus Information
Academic Year: 2018/19
Subject: 28412 - Laboratory Animal Science – I
Faculty / School: 105 -
Degree: 451 - Degree in Veterinary Science
ECTS: 3.0
Year:
Semester: First semester
Subject Type: Optional
Module: ---

General information

Aims of the course

The Laboratory Animal Science I course provides students with basic knowledge about animal experimentation. The subject of Laboratory Animal Science I together with other subjects such as Embryology and Anatomy, Biology and Biochemistry, Cytology and Histology and Ethnology and Animal Welfare, Genetics, Animal Physiology and Deontology, Legal Veterinary and Bioethics provide basic knowledge and skills for other subjects from other modules of the Degree in Veterinary Science.

The general goal of the course is to study the characteristics (physiological, genetic, behavioral, etc.) of the main animal species used in animal experimentation, as well as the legislation regulating their housing and care.

Context and importance of this course in the degree

The subject of Laboratory Animal Science I allows students to acquire basic knowledge on various aspects related to the field of animal experimentation that will be necessary to take the subject of Laboratory Animal Science II in the 4th year of the Degree in Veterinary Science.

Recommendations to take this course

The student must have taken all the first year subjects of the degree and be enrolled in the subjects that may have been pending in that year.

Solid knowledge of animal anatomy and histology, biology, as well as ethnology and animal welfare is required.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Explain current Spanish and international legislation on animal experimentation.
- Explain alternative methods to the use of research animals.
- Explain the anatomical, physiological, reproductive, genetic and behavioral characteristics of the main animal species used in animal experimentation.
- Describe the general characteristics of housing, feeding and care of the main animal species used in animal experimentation.
- Describe the main indicators of health and disease in animal species used in animal experimentation.
- Carry out basic handling of small experimental animals.

Learning outcomes

If students complete the course successfully, they should be able to

- Know, understand and explain the current Spanish and international legislation on animal experimentation.
- Know and explain the generalities, objectives and current situation of alternative methods to the use of animals in research.
- Recognize and explain the anatomical, physiological, reproductive, genetic and behavioral characteristics of the main animal species used in animal experimentation.
- Describe the general characteristics of housing, feeding and care of the main animal species used in animal experimentation.
- Describe the main indicators of health and disease in animal species used in animal experimentation.
- Carry out the basic handling of the small experimental animals.

Importance of learning outcomes

They allow you to know some basic aspects related to the field of animal experimentation that you will need to take the subject of "Laboratory Animal Science II" in the 4th year of the Degree in Veterinary Science.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the intended learning outcomes by means of the following assessment tests:

A global test of the subject, which will take place on the date determined by the Centre, and which will consist of 2 independent tests.

Test 1. Theoretical examination. The theoretical knowledge will be assessed by means of a written test consisting of 20 multiple-choice and 10 short questions.

Passing this test will accredit the achievement of learning outcomes 1, 2, 3, 4 and 5. The grade will be 0 to 10 and will represent 80% of the student's final grade in the subject.

Test 2. Evaluation of the practices. The acquisition of abilities and skills in the execution of the different practices of laboratory or computer room will be assessed. In addition, practice 1 and 2 will be assessed by means of a written test consisting of 2 short questions. Practice 3 will be evaluated through participation in a forum that will be open to students in Moodle platform. Successful completion of these tests shall be evidence of achievement of learning outcome 6.

Each practice will be graded from 0 to 1 point, being able to obtain up to 3 points in test 2, and will suppose 20% of the final grade of the student in the subject.

The final grade of the subject will be made by means of the **weighted sum** of the grades obtained in the theoretical and practical parts, where the **theoretical** part **will suppose** an **80% and** the **practical** part a **20%**.

Valuation criteria and requirement levels

In order to pass the course, it will be necessary to pass, separately, the 2 evaluation tests.

Test 1. Theoretical examination. The exam will consist of 20 multiple choice questions and 10 short questions corresponding to the theory topics. Each multiple choice question will have 4 options, of which 1, 2, 3 or 4 of these options will be the correct ones. Marking all the correct options in that question will be rated with the maximum grade for that question, i.e. 1 point; marking only some of the correct options will be rated with a grade lower than the maximum, i.e. less than 1 point; marking some of the incorrect options in a question will be rated with 0 points. The maximum number of points for multiple-choice questions is 20. Each short answer question will be scored on a maximum of 2 points. The maximum number of points for short questions is 20. In order to pass this test, it will be essential to obtain a total score of at least 20 points out of a maximum of 40 points, which will be equivalent to a 5 in the decimal rating.

Test 2. Evaluation of the practices. In order to pass the practical part of the course, it must first be demonstrated that the necessary skills and abilities have been acquired for the correct execution of the practices summoned throughout the different sessions. This will be done through the direct observation of the student's work by the teacher.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process designed for this subject is based on the following:

-Theory sessions: Participatory lectures will be taught in the classroom to a group of students.

-Practical sessions: Initially, the teacher will make a short explanation of the session and after that, the students will perform the practice under the permanent supervision of the teachers.

Learning tasks

- **Theory sessions:** Theory sessions (24 hours) will be taught in the schedule established by the Faculty.

- **Practice sessions:** Practical sessions (6 hours) will be taught in the Laboratory of Physiology or in the Computer room, distributed in 3 sessions of 2 hours. The dates will be announced in advance, so that the students choose the date that best suits them.

Syllabus

The program offered to help the student achieve the expected results includes the following activities:

PROGRAM OF THEORY SESSIONS

Theory sessions are divided into 5 thematic blocks, with the timing and assignment of hours described below.

I. ETHICS AND LEGISLATION (2 h)

- **Theme 1.** Ethical principles of animal experimentation. The principle of the Three R's. Ethics committees of animal experimentation. Objectives and functions.

- **Theme 2.** Legislation on animal experimentation. European, national and regional legislation.

II. ALTERNATIVES TO USE OF ANIMALS (2 h)

- **Theme 3.** Overview of alternative methods in animal studies. Experimentation "in vitro".

III. BIOLOGY, HUSBANDRY AND MAINTENANCE OF LABORATORY ANIMALS (15 h)

- **Theme 4.** Comparative anatomy and physiology of the laboratory animals.

- **Theme 5.** Breeding and reproduction of laboratory animals.

- **Theme 6.** Behavior and welfare of laboratory animals. Stress and recognition of signs of stress and suffering. Environmental enrichment.

- **Theme 7.** Facilities and environment. Types of facilities for laboratory animals.

- **Theme 8.** Factors affecting animal experiments: genetic standardization.

-**Theme 9.** Factors affecting animal experiments: microbiological standardization. Types of barrier and protected areas.

- **Theme 10.** Nutrition and feeding regimes. Types of diets.

IV. LABORATORY ANIMAL HEALTH (2 h)

- **Theme 11.** Health status and diseases prevention.

- **Theme 12.** Practical aspects of monitoring health and disease.

V. OCCUPATIONAL HEALTH AND BIOSAFETY AT WORK WITH EXPERIMENTAL ANIMALS (3 h)

- **Theme 13.** Health and safety of staff.

- **Theme 14.** Cleaning and disinfection of facilities.

- **Theme 15.** Proper waste and animal carcasses disposal procedures.

PROGRAM OF PRACTICAL SESSIONS

The program consists of 6 hours of practical activities, divided into 3 sessions of 2 hours. Practices involving the use of animals have been subjected to prior evaluation by the Advisory Ethics Committee for Animal Experimentation of the University of Zaragoza (License number PD03/15).

- Practice 1. Basic techniques of handling and restraining rodents: rat and mouse. Identification and sexing.

- **Practice 2.** Basic techniques of handling and restraining of lagomorphs used for animal experimentation: rabbit. Recognition of the main anatomical structures of small laboratory animals.

- **Practice 3.** Discussion of animal experimentation from a social perspective.

Course planning and calendar

Conducted lectures dates will be available on the website of the Faculty of Veterinary Medicine (link http://veterinaria.unizar.es/). This link will be updated at the beginning of each academic year.

Conducted practice dates will be announced in advance, so that the students choose the best date that suits them. The approximate dates of the practices will be as follows:

Practice 1: Third week of October

Practice 2: Fourth week of October

Practice 3: During November

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28412

Universidad Zaragoza

Year : 2018/19

28413 - IT Tools for Vets

Syllabus Information

Academic Year: 2018/19
Subject: 28413 - IT Tools for Vets
Faculty / School: 105 -
Degree: 451 - Degree in Veterinary Science
ECTS: 3.0
Year:
Semester: First semester
Subject Type: Optional
Module: ---

General information

Aims of the course

The general goal of this subject is to ensure that students acquire basic skills in the use of computer tools that they will certainly need both in their academic and professional life, thus facilitating the transmission of their own knowledge in the disciplines of the degree.

In addition, the students are encouraged to participate actively in their learning process, involving them in it and moving them away from the mere role of passive observers.

Context and importance of this course in the degree

Due to the instrumental nature of this subject, the passing of this discipline must enable students to follow the rest of the specific subjects of the degree.

Recommendations to take this course

Students must have taken all the first year subjects and be enrolled in those that have not been passed.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Make communication more correct and effective, both orally and in writing.
- Master the computer applications related to the field of study, as well as the use of the Internet as a means of communication and a source of information.
- Improve the ability to organize and plan independently work and information management.
- Improve time planning and management.
- Design and manage projects, enhancing critical capacity, analysis and synthesis, as well as decision making

Learning outcomes

If students complete the course successfully, they should be able to

1. Use basic computer tools.
2. Use a word processor for writing and reporting.

3. Use a word processor to do small layouts.
4. Search for and manage information related to the professional activity of the veterinarian.
5. Design and manage a website at a basic level.
6. Design a presentation to spread fluently in an oral way the information obtained during the professional exercise.
7. Present and defend a project orally.
8. Use some specific software of veterinary application, particularly, to interpret and to raise different statements corresponding to real situations within the field of the linear optimization, interpreting the obtained solutions

Importance of learning outcomes

They contribute to the training of students to face the rest of the more specific subjects of the degree in better conditions, being able to carry out a better treatment of the information they need.

On the other hand, the strengthening of generic or transversal competences of an instrumental, interpersonal and systemic type will contribute, together with the rest of the subjects, to the integral formation of future Veterinary Graduates.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

1. .Evaluation of the skills and abilities acquired in the practical classes carried out in the computer room through the continuous observation of the student's work and the correction of the documents generated in each practice. Alternatively, for those students who have not attended all the practices, this evaluation will be carried out in the official announcements on the dates set for this purpose by the Centre, with a duration of 2 hours. The grade will be from 0 to 10 and will represent 35% of the student's final grade in the subject. Some of the computer tools used will involve the use of programs in English. Passing these tests will contribute to accrediting the achievement of learning outcomes 1, 2, 3, 4, 5, 6 and 8.
2. .Evaluation of computer classroom practices. The student will have to solve in an individual way analogous situations to those worked in the practical classes. It will be carried out in the official announcements in the dates destined for this purpose by the Centre, with a duration of 3 hours. The grade will be from 0 to 10 and will represent 35% of the student's final grade in the subject. Some of the computer tools used will involve the use of programs in English. Passing these tests will contribute to accrediting the achievement of learning outcomes 1, 2, 3, 4, 5 and 6.
3. .Evaluation of the skills and abilities acquired in the design and oral presentation of a final subject project. This evaluation will be carried out in the official announcements on the dates assigned for this purpose by the Centre. The works can be done individually or in pairs, and there will be 10 minutes for their presentation. Each student must present their work and listen to the work of their classmates, so the duration of the session cannot be determined. The grade will be from 0 to 10 and will represent 30% of the student's final grade in the subject. Some of the computer tools used will involve the use of programs in English. Passing this test will contribute to accrediting learning outcome 7.

Although the three tests will take place on the dates indicated in the calendar of examinations drawn up by the centre, tests 1 and 2 will be convened additionally during the course of the school year, specifically during the course of the practice sessions. If a score of 5 out of 10 is obtained in each test, the test will be passed. The qualification obtained in these tests will be maintained in successive seasons.

Valuation criteria and requirement levels

The attitude of the student will be taken into account in the face-to-face sessions, as well as the capacity for critical reasoning and the application of theoretical knowledge to the analysis of situations, problem solving and decision making in real contexts. Likewise, the mastery of computer applications related to the field of study will be valued, as well as the use of the Internet as a means of communication and source of information.

In order to pass the subject, the student must achieve at least 50% of the grade in each of the first two assessment activities mentioned above.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The course is structured in 3 ECTS credits. Each student will receive 10 hours of face-to-face lectures format and another 20 hours of practice in the computer room.

In relation to lectures, the corresponding 10 hours will be dedicated to expose and debate the usefulness of the computer tools included in the program, presenting the different possibilities and options of use. The necessary documentation will be lodged in advance in a virtual course to which the students will have access during the whole course. In this way, the student can review it in detail before and after the corresponding class. Thanks to the tools used in the configuration of the virtual course, the materials are perfectly organized in each part into which the subject is divided. In general, the aim will be to encourage participation in class by means of interactive activities on the functioning of computer utilities.

The practices will be carried out in the computer room in two-hour sessions. For each computer tool, there will be several sessions where the computer tools included in the program will be put into practice. In addition, for each computer tool, there will also be a two-hour practice in the computer room, where the student will have to solve individually situations similar to those worked on in both the master classes and the practice classes. As in the theoretical part, the virtual course will house the scripts and aids for the realization of these practices and it will be there where the students will have to lodge the documents generated in each practice for its later evaluation.

For both the theoretical and practical parts, in addition to the face-to-face tutorials, the messaging and news system offered by the virtual course is used to maintain permanent contact with the students.

Learning tasks

Microsoft Word

Descriptors: The Word environment. Basic edition. Document format. Styles. Page design. Tables. Images and graphics. Organization charts and diagrams.

Competences:

Know how to use a word processor to write and present reports. To be able to format a text from an flat document. Make layouts with a word processor.

Teaching-learning activities: 0.44 ECTS

- Internship in a computer room: 2 internships of 2 hours each.

- 5 hours of autonomous work by the student. Within these hours, the possible attendance to individualized tutorials is taken into account.

Evaluation:

There will be a practice in the computer room at the end of this block of 2 hours, where the student will have to solve individually situations similar to those worked in the practice classes.

Internet: searches and design of Web pages

Descriptors: Internet descriptors. Search criteria. Database searches. Web page design.Web site hosting.

Competences:

Knowing how to manage the different Internet search directories. To define criteria of searches in the Net to delimit the results. Know how to search databases on the Web. Manage the information found on the Internet. To be able to design and manage a Web site.

Knowing how to master the different computer applications related to the field of study, as well as the use of the

Internet as a means of communication and a source of information.

Teaching-learning activities: 0.44 ECTS

- Internship in a computer room: 2 internships of 2 hours each.

- Study by the student: 5 hours of autonomous work by the student. Within these hours, the following are counted possible assistance to individualized tutorials.

Evaluation:

There will be a practice in computer room at the end of this block of 2 hours, where the student must to solve individually situations analogous to those worked in the classes of practices.

Multimedia Presentation Design: Microsoft PowerPoint

Descriptors: Environment and first steps. The views. Working with slides. Handling objects. Working with texts. Speaker's notes. Working with images, tables, graphs, diagrams. The drawing bar. Multimedia elements. Animations and transitions. Working in projection mode.

Competences:

Knowing how to design a multimedia presentation. Correctly manage the tools of a presentation. To be able to expose and defend a project orally.

Teaching-learning activities: 0.60 ECTS

-Lectures: 4 h (the contents of the descriptors will be worked on). The aim is to encourage participation in class through learning based on interactive demonstrations.

- Computer classroom practice: 2 practices of 2 hours each for the implementation of the explanations made in the master classes.

- Study by the student: 5 hours of autonomous work by the student. Within these hours, the possible attendance at individualized tutorials is taken into account.

Evaluation:

There will be a practice in the computer room at the end of this block of 2 hours, where the student will have to solve individually similar situations to those worked in the lectures and practice seasons.

Specific veterinary application software (Linear Programming for veterinarians):

Descriptors: Introduction to Linear Programming. General Linear Programming Model. Approach of problems of linear optimization with restrictions. Cattle rationing.

Competences:

Knowing how to identify a problem of linear optimization with restrictions. Be able to raise this type of problems in contexts specific to veterinary activity. To handle in a correct way specific software for the resolution of problems of Linear Programming.

Teaching-learning activities: 0.44 ECTS

- Lectures: 6 h (the contents of the descriptors will be worked on). The aim is to encourage participation in class through learning based on interactive demonstrations.

- Computer classroom practice: 1 practice of 2 hours to put into practice the explanations given in the master classes.

- Study by the student: 5 hours of autonomous work by the student. Within these hours the possible attendance to individualized tutorials is counted.

Evaluation:

The different written tests that will be proposed during the lectures will be collected.

Specific veterinary application software (Linear Programming for veterinarians):

Descriptors: Introduction to Linear Programming. General Linear Programming Model. Approach of problems of linear optimization with restrictions. Cattle rationing.

Competences:

Knowing how to identify a problem of linear optimization with restrictions. Be able to raise this type of problems in contexts specific to veterinary activity. To handle in a correct way specific software for the resolution of problems of Linear Programming.

Teaching-learning activities: 0.44 ECTS

- Master classes: 6 h (the contents of the descriptors will be worked on). The aim is to encourage participation in class through learning based on interactive demonstrations.

- Computer classroom practice: 1 practice of 2 hours to put into practice the explanations given in the master classes.

- Study by the student: 5 hours of autonomous work by the student. Within these hours the possible attendance to individualized tutorials is counted.

Evaluation:

The different written tests that will be proposed during the lectures will be collected.

Realization and defense of a final project of subject Competences:

Knowing how to design a project that includes the use of a computer tool. To be able to expose and defend this project orally. Know how to manage time.

Teaching-learning activities: 1 ECTS

- Exhibition and defence: 5 hours in person. You will have about 10 minutes for each job. Each student will have to present their work and hear that of their classmates, so the duration of the session will be five hours.

- Preparation of the project by the student: 20 hours of autonomous work by the student. Within these hours, the possible attendance at individualized tutorials is taken into account. Work can be done individually or in pairs.

Evaluation

Both the design of the project and its exposure and defense will be assessed.

Summary table of teaching- learning activities

Activities	**hours**
Lectures	10
Practice sessions	20
Autonomous work and study	40
Assessment	5
TOTAL	75

Syllabus

Microsoft Word

Descriptors: The Word environment. Basic Edition. Document Format. Styles. Page design. Tables. Images and graphics. Flowcharts and diagrams.

Internet: search and web design

Descriptors: Descriptors Internet. Search criteria. Searches databases. Web pages design. Hosting websites.

Design multimedia presentations: Microsoft PowerPoint

Descriptors: Environment and first steps. The views. Working with slides. Handle objects. Working with texts. Speaker notes. Working with images, tables, graphs AND diagrams. The bar drawing. multimedia elements. Animations and transitions. Working in Slide view

Specific veterinary application software (Linear Programming):

Descriptors: Introduction to Linear Programming. General linear programming model. Approach linear optimization problems with restrictions. Linear Programming and Livestock ration formulation.

Course planning and calendar

As it is an optional subject, only the schedule of the lectures will be programmed by the Center. In order to design the calendar of the practical classes it will be necessary to know in advance the calendar of the rest of the core subjects in order to find the gaps where to place those sessions. With this premise, it will be tried that the sessions are distributed in a uniform way throughout the semester.

The dates and key milestones of the subject are described in detail, along with the rest of the subjects of the second year in the Veterinary Degree, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradovet/). This link will be updated at the beginning of each academic year.

The dates and key milestones of the course are described in detail, together with the rest of the subjects of the second year in the Veterinary Degree, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradovet/). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28413

Universidad Zaragoza

Year : 2018/19

28414 - History of Veterinary Science

Syllabus Information

Academic Year: 2018/19

Subject: 28414 - History of Veterinary Science

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 3.0

Year:

Semester: First semester

Subject Type: Optional

Module: ---

General information

Aims of the course

The main goal is to introduce students to the origin and evolution of Veterinary Science and its location in the History of Science. Students should acquire a basic knowledge about the evolution of the profession and its organization through the times, as well as the assessment and understanding of the historical trajectory of veterinary science and profession.

Other objectives are: introduction to veterinary terminology, information and documentation, and introduction to the management of historical sources and veterinary documentation.

Context and importance of this course in the degree

During the development of the Grade, students do not have a subject in which the sense of the veterinarian is exposed and the social importance that has had and continues to have. Studying the subject, the student will become aware of the evolution of the profession over time, from the beginning when the figure of the veterinarian was that of a mere healer of animals, to nowadays in which not only veterinary medicine but also the production and health and hygiene of food of animal origin takes on importance.

The meaning and context of Veterinary History is based on the study of the past of the veterinary profession in order to better understand the role of the profession in the current social context of Europe in the 21st century.

Recommendations to take this course

Interest in the history of the veterinary profession, understanding that this is one of the oldest professions of humanity, because the care of animals by man has occurred from the very moment of their domestication. Interest in the history of science and its development in the West, since veterinary science is an important part of it.

No previous knowledge is required to study the subject, only those related to the study of History acquired in the baccalaureate. Enrollment in the course is recommended so that the student, future veterinary professional, can know and understand the development and concept of our profession and how it has varied through the different historical periods

Competences and Learning outcomes

Competences

On successful completion of this course, the student will be more competent to understand the past and importance of the veterinary profession and be able to transmit it in any professional context.

Learning outcomes

If students complete the course successfully, they should be able to

1. Relate the basic knowledge of Veterinary history with the rest of the subjects that make up the curriculum.
2. Differentiate the "veterinary performances" that took place before the birth of the Veterinary as a Science and as a Profession.
3. Know in chronological form, the historical facts that have been fundamental for Veterinary Medicine, so much to national level as international.
4. Manage bibliography and other sources of knowledge related to veterinary medicine and using them to carry out simple works of historical research.

Importance of learning outcomes

The student will develop practical and methodological skills through non-presential work; which will make them to develop text analysis, search for manual and computerized documentation, understand it and translate it into a brief work of historical research that will have to defend in front of the class and teachers.

They will also develop the ability to understand the synchronous and diachronic facts of the important facts that have marked the history of the veterinary profession.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The final grade of the course will consist of the evaluation of the theoretical part (60% of the grade) and the practical part (40% of the grade), according to the following guidelines:

- Continuous assessment of the theoretical classes. It will consist of 3 short answer questions about the content of the class, which will take place in the final minutes of each of the 15 theoretical sessions. Each question will be assessed with 1 point. Evaluates learning outcomes 1, 2 and 3. Those students who attend 6 or fewer classes will be 0% of the theoretical points. Those who attend 7-10 classes will be 70% of the theoretical points. Students attending 11 or more classes will have 100% of the theoretical points. This part will be 50% of the subject's theoretical grade.

- ***Written examination of the theoretical subject***. It will consist of 15 questions, with a brief answer, one for each topic explained and which will be carried out on the date foreseen by the centre. Evaluate learning outcomes 1, 2 and 3. Each question will score 2 points. Passing this exam will require obtaining half of the total exam points. This part will be 50% of the subject's theoretical grade.

- Accomplishment and exposition of a work and discussion of the works of other groups. It will be held at the last weeks of the quarter. Evaluates learning outcome 4. The evaluation of the practical part accounts for 40% of the final grade of the subject. The exposure will be scored from 0 to 10.

- *Global assessment:* Students who do not perform the continuous assessment will be required to conduct a global assessment of the entire subject. It will consist of a historical research paper (40% of the final grade) and a written exam with 15 questions of the theoretical part and 60% of the final grade.

In order to pass the course it is necessary that the student obtains a grade of 5 or more in the theoretical examination and in the exposition of the work. It is not possible to compensate the theoretical grade with the work grade and vice versa.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose

The passing of the practices and their qualification will be maintained for successive calls of the subject in subsequent courses, within the Grade.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that has been designed for this course is based on the face-to-face teaching with 15 lectures where is collected, summarized, the history and major events of the veterinary profession.

A practical program that includes management of bibliography and sources of knowledge; production and exhibition of a monograph work on group, and discussion of the works exhibited by other groups. Visits to museums, archives or libraries of veterinary interest explained by professionals of these centers.

Learning tasks

The program offered to students to assist in achieving the expected results includes the following activities

- Class attendance to develop the main themes of which consists the agenda. Exhibition of theoretical issues in classroom (teachers may put these topics and information available to the student in the ADD, Moodle platform). This activity comprises 15 hours.
- Management of bibliography, search of information and sources of knowledge (3 hours), which will be held in the computer classroom and the library of the Faculty of Veterinary medicine.
- Tutoring, support to the work of historical research that the student needs to develop both learning the contents of the lectures. The activity is 3 hours.
- The student will perform a work on group (literature review, review of historical novel, and comment on old veterinary material), about a subject previously agreed and supervised by the teacher. Each group will expose your work to the teacher and other students who will participate in the discussion of the same. This activity comprises 4 hours.
- Visit to archives, museums and libraries: we will visit Casa Ganaderos and the library of the humanities, Maria Moliner. In these centers will be consulted old books of Albeitería and livestock by which the student checks the sources of history of the veterinary knowledge. The activity is 5 hours.

Syllabus

The course will address the following topics:

Theoretical programme

TOPIC 1- The veterinary. Concepts on their mission from the antiquity to them times current: judgment critical. The veterinary word and its different meanings.

TOPIC 2- The veterinary medicine in the age old: prehistory and sources natural. Animal domestication**.**

TOPIC 3- The veterinary in the world classic: Greece and Rome.

TOPIC 4 - veterinary medicine in the Middle Ages: guilds, brotherhoods. The Arabic legacy.

TOPIC 5- The livestock in the Middle Ages: El Concejo de la Mesta and the Casa de Ganaderos of Zaragoza.

TOPIC 6- The Spanish Albeitería (1500-1850). Training and professional regulation: the protoalbeiterato institution.

TOPIC 7- Scientific advances of the centuries XVI-XVIII and its importance in the context of veterinary. Humanism scientific.

TOPIC 8 - The birth of veterinary education in the world. Claude Bourgelat. Foundation of the veterinary schools of Lyon and Alfort (Paris**).**

TOPIC 9 - The origin of veterinary education in Spain: the school of veterinary medicine in Madrid. The first plans of study. The figure of Mr. Segismundo Malats and its heritage.

TOPIC 10- Development of the teaching official of the veterinary in Spain. Free veterinary schools. The

end of the Albeitería. The work of Risueño y Casas de Mendoza.

TOPIC 11- The Military veterinary. His influence in the birth of the profession. Military Veterinary corps.

TOPIC 12 - The veterinary facing the mayor animals diseases.

TOPIC 13 - The food science veterinary, the inspection and the control of food.

TOPIC 14 - Veterinary medicine in defence of public health. Fight against zoonoses.

TOPIC 15 - New curricula. Faculties of Veterinary Medicine. Institutions and veterinary professional organization.

Practical programme

1. Introduction. Management of bibliography, search of information and sources of knowledge, that is held in the classroom computer and in the library of the veterinary Faculty.
2. Production, exhibition and discussion of monographic works, comment of text, into groups of 3-4 students. It will consist of the work by the teacher tutoring and exposure to other students and teachers.
3. Visits to museums, archives or libraries. Casa de Ganaderos and the library's Humanities Maria Moliner will be visited. In these centers are saved important documents and books of ancient livestock and of Albeitería.

Course planning and calendar

The subject is taught during the first semester of the course with a class theoretical to the week to complete the 15 planned. The practical program will require a 3 hour session for search and management of bibliography, 2 sessions of 2.5 h and a session of 2 h, for the tutoring of works and subsequent exposure and discussion, and two sessions of 2.5 hours for the visit to archives and museums.

The course will be taught in the first four-month period from the 2nd year of the Degree in Veterinary Medicine.

The dates and key milestones of the course are described in detail, together with the rest of the subjects of the Veterinary Degree, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradoveterinaria/).

This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28414

i. Dunlop, Robert H. Veterinary medicine: an illustrated history / Robert H. Dunlop, David J. Williams . St. Louis : Mosby, cop. 1996

ii. Lafuente González, Javier. La veterinaria a través de los tiempos / Javier Lafuente González ; Yolanda Vela Palacio Zaragoza : Servet, 2011

iii. Sanz Egaña, Cesáreo. Historia de la veterinaria española : albeitería, mariscalería, veterinaria / Por C. Sanz Egaña . Madrid: Espasa-Calpe, 1941

iv. Semblanzas veterinarias. Vol.III / Francisco Luis Dehesa Santisteban ... [et al.], co-directores . Madrid : Consejo General de Colegios Veterinarios, D. L. 2011

v. Gómez Piquer, José. Crónica de 150 años de estudios veterinarios en Aragón (1847-1997) / J. Gómez Piquer, J. M. Pérez García . Zaragoza : Institución Fernando el Católico, 2000

vi. Herrero Rojo, Máximo. La albeyteria española en el siglo XVIII / Maximo Herrero Rojo Salamanca : [El Autor], 1984

vii. Moreno Fernández- Caparrós, Luis Ángel. Historia de los uniformes y distintivos de la veterinaria militar española / Luis Ángel Moreno Fernández Caparrós, Heliodoro Alonso Fermoso . [Madrid] : Ministerio de Defensa, Secretaría General Técnica, 2013

URLs:

- American Veterinary Medical History Society - [http://avmhs.org/]
- Asociación Argentina de Historia de la Veterinaria - [http://asarhive.4t.com]
- Asociación Española de Historia de la Veterinaria - [http://historiaveterinaria.org/]
- Societé Française d'Histoire de la Médecine et des Sciences Vétérinaires - [http://www.histoire-medecine-veterinaire.fr/fr/]
- The Veterinary History Society - [http://www.veterinaryhistorysociety.org.uk/]
- World Association for the History of Veterinary - [http://www.wahvm.org/]

Universidad Zaragoza

Year : 2018/19

28415 – Scientific English for veterinarians

Syllabus Information

Academic Year: 2018/19

Subject: 28415 – Scientific English for veterinarians

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year:

Semester: First semester

Subject Type: Optional

Module: ---

Teachers

- Mercedes Jaime Siso mjaime@unizar.es

General information

Recommendations to attend this course

To be successful, the student is recommended **to start with at least the level** of general English (written and oral) acquired in *Bachillerato*, which is equivalent to **B1** of the Common European Framework, whose achievement requires the following skills:

- understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc.
- understand the main point of many radio or TV programmes on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear.
- understand texts that consist mainly of high frequency everyday or job-related language.
- receive and give orders and instructions in both written and oral English
- deal with most situations likely to arise whilst travelling in an area where the language is spoken.
- enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life (e.g. family, hobbies, work, travel and current events).
- briefly give reasons and explanations for opinions and plans.
- narrate a story or relate the plot of a book or film and describe his/her reactions.
- write simple connected text on topics which are familiar or of personal interest.
- write personal letters describing experiences and impressions

The course will be entirely delivered in English and communication in the classroom takes place only in this language. The student is also advised to work on it steadily, which implies attending both lessons and practice sessions on a regular basis.

Course Schedule and Deadlines

The activities and key dates will be communicated at the presentation of the module for each group and during the semester in due time.

The official hours and dates of the final exams can be found on the web pages of the Veterinary Sciences Faculty (http://veterinaria.unizar.es/)

Note that it is the responsibility of students to ensure that they have read and understood this document and all the information about the course, and have checked lessons timetable and exam dates in advance, so as to be able to plan their work schedule. If you are in any doubt, talk to the teacher in good time.

At the end of the teaching period students will be evaluated by means of a global examination (*vid*. Evaluation section in the present guide).

Learning outcomes that define this course

The student, in order to pass the course, will have to show his/her competence in the following skills:

1: Make use of specialized terminology commonly used in the academic and professional contexts related to veterinary practice.

2: Understand and correctly interpret specialized texts written in English about topics related to the veterinary studies and related jobs, so that they can make everyday use of the bibliographical resources needed in the course of his/her degree studies.

3: Identify and make use of the adequate register used in the different spheres where scientific communication occurs.

4: Produce short texts about topics related with his/her academic activities using the rhetorical functions adequate for the corresponding communicative act.

5: Identify and understand the main points in a lecture or speech in English on topics related to his/her areas of study and future professional activity.

6: Participate in conversations and debates on topics pertinent to their academic activities.

7: Detect the differences between the language used for general purposes (General English) and the use of English in academic scientific contexts.

Introduction

Brief presentation of the course

The ***Scientific English for Veterinarians*** course is an optional module of 6 ECTs included in the 2nd year programme of the BSc degree course in Veterinary Sciences. It provides students with content and practical activities leading to achieving an upper intermediate level of the lexical, grammatical and communication skills in Scientific English within the scope of veterinary studies and professional activities, in order to help them communicate effectively in these contexts.

Students who successfully complete this module are entitled to apply for the 2 ECTS corresponding to the required B1 level of English (Common European Framework of Reference for Languages) by presenting the corresponding application form at the faculty office.

Please, look up the application procedure at: http://wzar.unizar.es/servicios/primer/2matricula/academica/certi.htm (Reglamento para la certificación de niveles de competencia en lenguas modernas)

http://wzar.unizar.es/servicios/primer/2matricula/academica/tabla_equivB1%20.pdf (Tablas de equivalencias de las distintas lenguas extranjeras).

Please, also check the Evaluation section of the present guide at this respect.

Competences

General aims of the course

The expected results of the course respond to the following general aims:

The general aim of this course is to enable the students to:

- communicate in English at a reasonable level of accuracy, adapting the message to the audience and the communicative purpose of the discourse, in different academic and professional contexts related with the veterinary Sciences .

- develop strategies and techniques for written and oral communication in English,

aiming to building, processing, interpreting and presenting scientific data and information.

- make use of bibliographical resources and veterinary websites published in English.

Context and importance of the course for the degree

Since English is the language internationally used in scientific communication, most bibliographical resources and

online learning material used by students of this degree are published in English. Therefore, apart from providing students with the necessary skills to use English in academic and professional veterinary contexts, it will also contribute to developing their proficiency in reading and understanding texts necessary to reach the objectives set for the degree.

After completing the course, the student will be competent in the following skills:

1: understand, analyze, evaluate and produce short scientific texts related to those subjects composing his/her degree course, making use of an adequate linguistic approach.

2: find specific information within a wider text as a result of both his/her knowledge of specialized terminology and of being familiar with the rhetorical structure of scientific discourse.

3: participate in conversations and debates on veterinary topics applying communicative strategies an academic context.

4: apply useful strategies in searching information online in English, through the use of keywords and linguistic tools such as specialized dictionaries, data bases, veterinary websites, university libraries, veterinary podcasts…)

Relevance of the skills acquired in the course

The skills acquired will provide the students with communicative competences that are essential in post-graduate studies and that are currently crucial to access scientific knowledge. These competences will undoubtedly enhance their employability in a globalized labour market where a proficient command of English for professional purposes is highly valued.

Evaluation

Assessment tasks

The student will prove that he/she has achieved the expected learning results by means of the following assessment tasks:

1: Global Examination: All students of this module are evaluated at the end of the semester by means of a global evaluation of the command of English. A model exam will be provided in advance so that students are aware of the level required to pass the test, and the tasks to be completed.

Assessment will cover all the material that has been used and studied in the course and what students are expected to have acquired as independent learners. The examination will be based on the completion of tasks similar to those carried out throughout the course. These will include:

- the use of specialized terminology and the ability to deduce the meaning of words through the context (25%).
- paragraph building on veterinary topics using scientific information and applying the morphosyntactic, semantic and lexical structures that define scientific language (30%).
- rephrasing the information given by applying knowledge of synonyms, antonyms, use of connectors, abbreviations and other linguistic features necessary to express the functions which characterize biomedical scientific language (description, classification, definition, comparison, instructions…) (15%).
- understanding authentic (not linguistically adapted) veterinary texts, applying meaning-deduction techniques, understanding complex noun compounds, demonstrating knowledge of word-formation (prefixes, roots, suffixes), and identifying textual structure depending on the communicative function of the selected text (20%).
- using keywords in online information search (10%).

Assessment criteria

Accuracy in the use of the English language and appropriateness of style (formal register and specific veterinary vocabulary); coherent organization of the information adjusting to the respective discourse structure of the different scientific genres.

More detailed evaluation criteria have already been specified in the description of the different assessment tasks.

Remember that, in order to successfully complete the course, the student will have to obtain **at least 60%** of the total available marks.

IMPORTANT NOTE: Those students who, by the time the global examination is held, cannot demonstrate they have obtained official certification of possessing a B1 level of English command in the four skills (reading, writing, listening and speaking) will INEXCUSABLY have to pass an oral exam consisting of a 10-15 minutes conversation in English on topics related to those learnt and discussed throughout the course.

Academic marks system:

0-4,9: F (fail)

5,0-6,9: C and D levels

7,0-8,9: B level

9,0-10: A and A+ level

Marks will be expressed numerically according to the regulations included in article 5 of the Royal decree 1125/2003 published in the *Official State Gazette (Boletín Oficial del Estado –BOE)* where the European Credits System and the grading system for university studies are established.

Activities and resources

Course methodology

The learning process that has been designed for this course is based on the following activities:

This is a basically practical course, and consequently, although part of every class session is likely to involve direct teaching, the emphasis is on student participation in English. They will be expected to take part actively in discussion and in tasks such as small group and pair work where the concepts and knowledge acquired will be applied.

With this aim, and before each session, the students will be provided with a summary of the main points of the lesson (through the *Moodle* platform), to optimize the performance of the available contact hours.

Each theoretical session will last 50 hours. Part of this time will be devoted to explaining and exemplifying the main points of the corresponding unit, working with authentic (not adapted) oral and written texts relating to a great variety of veterinary topics. Students will then be required to actively participate in problem-solving activities for which they will be provided with further explanations when required. Thus, despite being referred to as "theoretical", these sessions entail active participation of the students in all cases.

These sessions will be complemented with a series of purely practical 50 minute classes where students will be able to put into practice the knowledge acquired by completing tasks which require the use of scientific language.

The student will also be expected to spend time studying outside the class using extra facilities and materials to help them develop their expertise as independent language learners. The completion of a series of exercise and tasks will also be required.

There is no set textbook. The supporting printed learning materials for the course will be available from the reprography service of the faculty. To help students to develop an autonomous learning programme, extra supporting materials to consolidate English grammar and pronunciation as well as extra practice materials for veterinary related topics will be provided in the Digital Platform https://moodle2.unizar.es/.

Authentic print and multimedia material covering a variety of styles, registers and genres will be used too.

Outline of the Programme

The programme offered to the students to help them achieve the desired results and outcomes includes the following activities:

1: **Lectures**: with the main objective of conveying the fundamental concepts of the module, so that goals set by the teacher are achieved. The lecture is expected to be participatory and to encourage debate and clarify issues and questions based on the learning materials.

2: **Practice sessions**: individual and group tasks on veterinary related texts interpretation, discussions, team work and group interaction.

3:Tutorials and evaluation that allow a more direct and personal support to students in order to monitor tasks, answer questions and guide them in the study. These tutorials may be individual or in a group.

Course syllabus

Contents are divided into 20 units (plus a preliminary unit) that are distributed as follows:

1. Describing qualifications in Higher Education. Identifying and defining the different sciences and subjects composing the veterinary degree. Naming and describing activities and jobs related to the veterinary profession.

2. Describing physical features. External characteristics of animals. Rhetorical functions: physical description. Linguistic content: degrees of generalization, comparative structures, descriptive statements.

3. Naming statements. Identifying and recognizing common terms used for animals. Defining common terms used to denote sex and age of animals. Defining common terms used to denote birthing and grouping of animals. Rhetorical functions: definition.

4. Classifying techniques. Establishing the basis for a classification. Animal classification. Rhetorical function: Classification and physical description.

5. Describing shapes, properties, size, dimension and colour.

6. Describing animal morphology. Expressing similarities and differences. Rhetorical functions: describing and defining. Linguistic content: comparison and contrast.

7. Formal vs Informal definitions. Basic components of a formal definition.

8. Learning Anatomical terminology: general directional terms, directional terms for limbs. Planes of section. Rhetorical functions: definition and description Linguistic content: Passive/stative structures. Locative statements.

9. Describing structures (1). Verbs associated with structures: composition, location and direction. Relationship between elements.

10. Describing structures (2) The musculoskeletal system terminology. Describing bone anatomy terms. Constructing anatomical terms from word parts.

11. Building up a veterinary vocabulary. Prefixes and suffixes. Roots and Combining forms. Identifying and recognizing the parts of a medical term. Defining commonly used prefixes, combining forms and suffixes. Analyzing and understanding basic medical terms.

12. Describing structure, function and process (1) Using transitional words/phrases . Internal anatomy and physiology: the digestive system. Describing the process of digestion. The cardiovascular system: composition and function description.

13. Describing structure, function and process (2). Sequencing the steps in the process description. Internal anatomy and physiology: The nervous and respiratory Systems. Linguistic content: Markers of time sequence.Time clauses. Causality and result.

14. Deducing the meaning of words through context. Feeding farm animals. The constituents of foods. Food requirements. Linguistic content: Relative clauses.

15. Describing symptoms. The causes of ill health Linguistic contents: Clauses of condition. Clauses of Concession.

16. Describing pests and diseases of large animals (horses, swine, cattle, sheep, goats) Rhetorical functions: Classification. Instructions. Linguistic content: Statements of frequency. Statements of probability and tendency.

17. Understanding Veterinary Case Studies. The use of abbreviations. Technical vs semi-technical medical vocabulary in the veterinary profession.

18. Presenting Veterinary Case Studies. Pests and diseases of pets. Rhetorical functions: Visual-verbal relationships. Instructional expressions Linguistic content: Conclusive statements. Modal verbs of probability.

19. Practicing with common acronyms and abbreviations used in the veterinary profession. Linguistic content: Making deductions.

20. 19.Veterinary techniques. Identifying, naming and defining tools. Rhetorical functions: Definition, function and process description. Instructions. Visual-verbal relationships. Linguistic content: Complex noun phrases. Expressions of degree. Expressions of causality and result.

21. Testing. Drugs, disease and dissection. Describing terms and equipment for the basic physical examination. Recognizing and defining terms associated with laboratory analysis, radiographic and imaging procedures. Recognizing and defining terms associated with pharmacology and drugs used in various treatments, with pathological procedures and processes, and with different types of surgery and the instrumental used.

Course planning

Classroom sessions calendar and submission dates of individual or group work

Dates and times of all the course sessions will be announced on the website of the Faculty of Veterinary Sciences. Any other activities as well as the deadlines for the submission of works will be communicated by the lecturer at the beginning of the module.

Bibliographic references of the recommended readings

Recommended readings are recorded in the University Library's data base (go to 'bibliografia recomendada' in 'biblioteca.unizar.es')

Universidad Zaragoza

Year : 2018/19

28416 - External Morphology: Morphological Assessment and Identification

Syllabus Information

Academic Year: 2018/19

Subject: 28416 - External Morphology: Morphological Assessment and Identification

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 3.0

Year:

Semester: First semester

Subject Type: Optional

Module: ---

General information

Aims of the course

The general aim of this course is to enable the students to properly assess the morphological quality and identity of pets and production animals, from genetic, clinical and zootechnical points of view. For this reason, the student must demonstrate the learning outcomes.

Context and importance of this course in the degree

The subject is on the second year, in the first semester, so it will have students who have had previous contact with Veterinary Sciences in general and with Zootechnics in particular. This course aims to deep and broad the concepts learned in Anatomy and Ethnology, with a focus essentially applied to the identification and morphological assessment of domestic animals.

The learning and critical evaluation of the morphological standards of the different animal breeds is a good introduction to the professional reality in the veterinary clinic and in livestock production, so that the subject plays an important role in the training of the future veterinarians.

Recommendations to take this course

It is a second year elective subject of the first semester. For an adequate learning of its contents it is necessary to have followed Embryology and Anatomy I and II and Ethnology and Animal Welfare, all of them first year subjects.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Correctly identify animals and their products, in accordance with current legislation.
- Assess their health status on clinical examination. To give an opinion on its genetic quality and usefulness.
- Advise breeders on the most advisable crosses to improve the morphology of their specimens.
- Advise participants in contests and morphological exhibitions, and eventually act as a qualifying judge

Learning outcomes

If students complete the course successfully, they should be able to

- Know and apply the most appropriate animal identification methods in each case.

- Make a value judgment on the qualities and morphological defects of any important animal breed, in any domestic species.

Importance of learning outcomes

Appropriate knowledge and use of the various methods of animal identification are indispensable tools for the veterinarian in order to fulfill his tasks of ensuring the traceability of food intended for human consumption, safeguarding animal health, in particular in animal movements and in compulsory vaccination and sanitation campaigns, and helping to combat the illegal transport of animals and trafficking in protected species.

The ability to assess the suitability of animal morphology, according to age, sex and utility, is an important auxiliary tool for veterinary clinical judgment on the state of health or disease of an animal, collaborate in the numerous competitions and exhibitions of livestock and pets held throughout Spain, and advise breeders in their breeding programme, especially where external morphology is the main selective criterion, as in the case of companion animals, which sometimes leads to aberrations detrimental to animal welfare which it is the veterinarian's duty to help prevent.

In addition to the learning and acquisition of previously mentioned competences, students will be able to understand and take better advantage of other subjects that will go throughout their studies, both in the area of Clinical Sciences (especially Medical Pathology and Propedeutics and Clinical Practicum), as well as in the zootechnical subjects of Genetics, and those of Integration in Animal Health and Production of the different livestock species.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student will have to demonstrate that has reached the learning results foreseen in the evaluation of the different competences:

- The knowledge and understanding of the theoretical contents will be assessed with a multiple-choice question test.

- Practical skills will be assessed using a variety of methodologies:

  - Attendance at the practical sessions will be controlled and computable.
  - The teachers will be able to assess them at the end of the practical sessions by means of a simple test and/or the presentation of cases prepared in students´ groups.
  - Practical exercises will be included in the ADD for self-assessment purposes and in some cases applicable to ongoing assessment.
  - The field activities (equidae review, agility) will be assessed taking into account the attitude shown during the same and team work.
  - For the contents related to morphological evaluation, a final practical examination will be carried out based on photographs to be commented on.

The assessment criteria shall be as follows:

Theoretical exam, up to 40 points out of 100.

Practical test, up to 30 points out of 100.

Resolution of cases in the classroom and/or ADD, up to 10 points out of 100. Team work, up to 20 points out of 100.

In order to pass the exam, it is necessary to obtain at least 50% of the possible points for the theoretical and practical contents as a whole (35 points out of 70), and not less than 40% of the possible points for each type of contents (16 and 12 points, respectively). The rest of the qualifications will apply only after this minimum has been achieved.

The subject is passed with a grade equal to or greater than 5 points.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that has been designed for this subject is based on the following:

- On-site theoretical classes, in which the previously planned program will be developed, which will be available in the ADD, complemented with other teaching resources (CD, paper documentation).
- Practical classes in a morphological assessment classroom in different animal species. Practical classes in the classroom of methods of identification and recognition of the age of animals.
- Practical Session in Equestrian Center to make a complete review of the specimens.
- Practical session on Agility as a model of animal sports activity
- Performing a team work on the regulations of any sport related to any animal species
- Practical exercises through short-term tests in the classroom and / or the ADD.
- Visit to an exhibition or fair

Learning tasks

The program offered to the student to help achieve the expected results includes the following activities:

Theoretical classes in Classroom.

Practical classes in Classroom, participated with students. Practical classes in Equestrian Center.

Personal work (review, morphological evaluation of dairy cattle)

Teamwork, including public exposure

Syllabus

THEORETICAL PROGRAM

IDENTIFICATION

1. Identification. Traceability. Definitions. Identification and traceability in livestock. Areas involved and links. From the farm to the table. Standards of traceability in livestock in Spain. Legislation on bovine, ovine and caprine animals, equidae, and pigs.

2. The transport of animals. Loads and downloads. Legislation. Transport of animals in private vehicles

3. Identification of age: The dental table. Evolution and relation with chronological and physiological age in domestic species. Age in birds.

4. Development and age. Determination of age by general and regional analysis of the animal. Signs for the determination of age. Shape and proportions in young and adult animals. Body development in heterogeneous adult weight species.

MORPHOLOGY

1. External morphology. Body regions, brief review of the regional nomenclature. Aplomos: definition and general assessment. Defects with respect to lines 1 and 5. Defects with respect to lines 2 and 4. Defect with respect to line 3. Variation between species.

2. Introduction to morphological assessment. Definitions of beauty, defect, beauty and racial standard. General aspects of morphological assessment.

3. Types of morphological assessment. Comparison and Linear Qualification, utility and description in general and, specifically, dairy cattle.

4. Scorecards, utility and description. Conclusions.

5. Morphological evaluation in other companion animals. Physiological characteristics of lagomorphs (rabbit and hare), rodents (guinea pigs, chinchillas, hamsters and gerbils) and some carnivores (ferret) and their relationship to body shape and age.

6. The equine passport. Additional features

ANIMALS AND SPORTS

1. The horse in the sport. Breeds and modalities

2. Regulations of different tests: polo, jumps, horse races, etc.

3. Other sports involving animals: colombiculture, colombofilia, falconry, mushing

4. Agility

PRACTICAL PROGRAM

7. Identification. Identification by species. Cattle, sheep, goats, equines, pigs, dogs, cats and ferrets. Methods: eartags, passports, microchips.

8. Evaluation of horse tread.

9. The ideal udder.

10. The ideal cow.

11. Review in equines: Individual realization of a review, check and fix body regions, see layers and race

12. / fitness of some specimens.

13. Determination of age by studying dental arches in equines, cattle, sheep, pigs, dogs, cats and chinchillas. Age depending on the development of horns in cattle and sheep.

14. Rules for sporting events related to domestic animals

15. Agility as an example of a sports test

Course planning and calendar

Acitvity	Theorical classes	Practical	Group size	teacher
IDENTIFICATION	**6**	**3**		
Animal identification	2	1	25	AA
Animal Transport	1	---	---	GM
Age	3	2	25	ML
MORPHOLOGY	**6**	**5**		
Body regions	1	---	---	CS
Morphological valuation in livestock	3	3	25	CS
Morphological valuation in pets	1	---	----	ML
Horses	1	2	8	ML JL
ANIMAL and SPORTS	**3**	**3**		
Horse spots	2	1	---	GM
Other animal sports	1			AA
Agility	---	2	----	JE
Fairy trip		**4**		
TOTAL	15 (50%)	15 (50%)		

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28416

Universidad Zaragoza

Year : 2018/19

28417 - Parasitology

Syllabus Information

Academic Year: 2018/19

Subject: 28417 - Parasitology

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 2

Semester: Second semester

Subject Type: Mandatory

Module: ---

General information

Aims of the course

The approach in this subject starts from the situation of need to know the relationships established between living beings and more specifically those of negative type (parasitism) result of which one of the parts suffers a potential damage or current more or less important (host) while the other gets a benefit (parasite). This course focuses on the general knowledge of this biological phenomenon (parasitism), as well as the specific characteristics of parasitic living beings and the relationships they establish with their hosts, without forgetting the effect it has on each of the components and on the relationship itself with the environment. From the conceptual point of view, the relation of parasitism is usually established by living beings with a not very complex organizational level, viruses, bacteria, fungi, protozoa, helminths and to a lesser extent arthropod. In our country the first three groups are studied in the subject of Microbiology, while the protozoa, helminths and arthropods are studied in the subject of Parasitology.

Within the organisms that have parasitic life (obligatory or optional) this subject is addressed to those that affect animals of veterinary interest (income, company, wild and exotic) and also the human species (zoonosis).

The general objective, therefore, is for the student to know, understand and know how to apply the phenomenon of parasitism and its components and how it influences the health and productive aspects of animals of veterinary interest, as well as their role in Public Health (zoonoses and pests).

The student must know and understand the morphological, physiological, genetic and reproductive characteristics of the parasites, which will influence the final result of the relationship parasite-host, i.e. that the damage they cause is more or less important (parasitism or parasitosis).

It must also know and understand the mechanisms that the host (domestic animals, animals of veterinary interest and the human species) develop and set in motion to defend against them. Fundamentally the mechanisms of innate and acquired resistance (specific immune response)

You must also know and understand that and how environmental factors influence and act in the parasite-host relationship and in the two components separately.

This acquired knowledge and skills will enable you to understand the epidemiology, pathogenesis, clinical picture, diagnosis, therapeutics and prevention/control of the diseases they cause in animals and in the human species.

Context and importance of this course in the degree

Due to the basic character of clinical sciences and animal health of this subject, its overcoming must enable students to follow the rest of specific subjects of the degree.

At the same time and in a generic way, the student must acquire the competences listed in the Order ECI/333/2008:

FBC14- Study of microorganisms and parasites that affect animals and those that have an industrial, biotechnological or ecological application

FBC03 - Morphology, bionomy and systematics of animals and plants of veterinary interest

FBC15 - Bases and technical applications of the immune response

FBC17 - Description and pathogenesis of general alterations in the structure and function of cells, tissues, organs and systems.

CCSA04 - Recognition and diagnosis of different types of lesions and their association with pathological processes.

Recommendations to take this course

It is advisable to have studied Biology in the courses prior to entering the Degree, as well as having basic computer skills and average knowledge of the English language.

Requires previous knowledge of zoology, anatomy, physiology, cytology, histology and immunology.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Make use of critical scientific reasoning in the knowledge, evaluation and understanding of parasites as living agents producing disease and their role in health, animal production and public health.
- Apply the knowledge acquired in the understanding of epidemiology, pathogenesis, immune response, clinical, diagnostic, therapeutic, prevention and control of the infections they produce.
- Understand how environmental factors influence the health-disease of the animals under study in the veterinary degree and in the human species.
- Use parasitological diagnostic tools (Systematics and taxonomy, laboratory techniques).
- Use the Internet as a source of information as well as a means of communication.
- Master the aspects of communication, both oral and written. Show ability to organize and plan work autonomously.

Learning outcomes

If students complete the course successfully, they should be able to:

- Understand the biological phenomenon of parasitism
- Recognize the relationships between the components of the biological phenomenon of parasitism, Parasite-Host and how this relationship is influenced by the Environment (environmental factors).
- Handle the definitions of the main components of the parasitism relationship.
- Relate the main concepts and components of the biological phenomenon of parasitism.
- Recognize the structural (anatomical), physiological, genetic and ecological components of parasites (protozoa, helminths and arthropods).
- Understand and manage the taxonomy and systematics of parasite living beings that are studied in the subject.
- It is able to understand and apply the knowledge of the parasite-host relationship in the diagnosis of these.
- Know and understand the different aspects of the parasite-host relationship in order to explain the epidemiology, pathogenesis and prevention of the infections/diseases they cause in domestic animals, animals of veterinary interest and human species (zoonoses).
- Know and use laboratory tools and techniques for use in diagnosis

Importance of learning goals

These learning results are fundamental to enable students to have a solid base that allows them to face the rest of the more specific modules of the degree in the best conditions, and thus successfully model their professional profile. Concretely: Pathological anatomy, Integrations (of ruminants, birds and rabbits, companion animals, equids, pigs and aquatic and exotic animals). Hygiene, inspection and food control. Zoonoses, preventive medicine and health policy. Clinical Practice in small animals, exotics and equids. Clinical Practice: Production Animals. External supervised internships. End of degree work.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

Evaluation of theoretical knowledge. During the official period for conducting assessment tests (June-July and September examination periods scheduled by the center), a written test will be carried out in which students will accredit the acquisition of knowledge, skills and aptitudes indicated in the learning results indicated in the corresponding section. It will consist of 40 short answer questions, with a weighted distribution with respect to the theoretical knowledge imparted (general Parasitology, descriptive and bases for parasitological diagnosis). Each question will be graded 0-1. This part corresponds to 70% of the total score of the subject.

Evaluation of the practice sessions: face to face test in which the student will accredit the acquisition of knowledge, abilities and aptitudes of what is treated in the practical sessions. This assessment will consist of two parts: Written examination of 10 slides seen during the course, both in the practice and theoretical sessions and 3 specimens (micro and/or macroscopic) of parasites seen in the different practical sessions. The knowledge and perception of the morphological details of the different taxonomic types studied in the course will be assessed. The slides will have a maximum rating of 14% of the subject and the parasite specimens 6%.

Practical work: teamwork and oral presentation abilities of the acquired knowledge will be assessed. Students will have to prepare and present an evolutionary cycle of one of the genus of parasites that have been explained on the lectures. The work will be carried out jointly by the practice group that has already been designated. The communication of the topic of the work and the name of the tutor teacher will be done through the ADD.

Based on the evolutionary cycle explained in theory class, the group of students should make an assembly of graphics/photographs and text that points out the most important points of the cycle and readily understandable. In order to carry out the work, the students will be able to count on the information and iconography published in the ADD of the subject, as well as material from other sources (web pages for example), always indicating the origin. They can (should) also count on the collaboration of the tutor teacher.

The group should make the presentation in Power Point format. The exposition of the work will take place in practice 10, it will be an oral presentation and last 10 minutes.

This activity is compulsory and will carry a maximum of 10% of the total score of the evaluation of the subject.

The clarity of concepts, the realization of the presentation, the exposition of the work and the collaboration between the components of the group will be mainly assessed.

In order to summarize the proposed evaluation of the subject, the following table is included:

Activity	
1. Evaluation of theoretical knowledge	70%
2. Evaluation of the knowledge, skills and abilities obtained in the practical sessions	20%
3. Practical work	10%
Total	**100%**

Valuation criteria and requirement levels

The result of the overall sum of the scores of the three evaluation activities must be equal to or greater than 5, but in addition, in the evaluation of theoretical and practical knowledge at least 50% of the score must be reached, i.e. 3.5 (7) and 1.5 (3).

A pass mark in any of the two parts of the course (theory and practice) will be kept for an academic year, with the mark originally obtained.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources Methodological overview

Methodological presentation

The learning process that has been designed for this subject is based on the following:

The course is structured in two blocks: General Parasitology and Descriptive or Special Parasitology. The master classes comprise 40 hours. The practical classes comprise 20 hours.

For master classes, students have prior access, through the ADD, to the lesson to be explained. So it's important that they take the lesson read to better assimilate the class.

The practical sessions will take place in the Parasitology Laboratory (first floor, HCV), in sessions of two nominal hours. The student must perform the steps following the script and material that will be provided for each practice. Previously, the teacher will have explained the content and objective of the practice.

Learning tasks

The program offered to the student to help him/her achieve the expected results includes the following activities.

Syllabus

THEORY

GENERALITIES (4 hours)

Topic 1. Concept of Parasitology. Historical evolution and relationship with other sciences. Parasitism and its relationship with other types of biological associations. Origin and evolution of parasites. Adaptations to parasitism: speciation and Parasitical Specificity.

Topic 2. Classes of parasites. Biology and Physiology of parasites. Biological Cycles. Systematics, Taxonomy and Zoological Nomenclature. General classification of parasites of veterinary interest.

Topic 3. Parasite-Host Relations. Routes of invasion of the hosts. Pathogenic actions of parasites. Host-defense reactions. Parasitic resistance and immunity. Mechanisms of evasion of the parasitic immune response.

Topic 4. Parasite-Host-Environment Relations. Propagation of parasites. Influence of environmental and socio-economic factors.

PROTOZOOS (13 hours)

Topic 5. Subkingdom Protozoa. General characters and taxonomic classification. Phylum Sarcomastigophora Subphylum Mastigophora (flagellates). General characters and classification. Order Kinetoplasty. Family Trypanosomatidae: Genera *Trypanosoma* and *Leishmania*.

Topic 6. Order Diplomadida. Family Hexamitidae: Genera *Giardia* and *Hexamita*. Order Trichomonadidae. Family Trichomonadidae: Genus *Trichomonas* and others of interest. Family Monocercomonadidae: Genus *Histomonas*.

Topic 7. Phylum Sarcomastigophora. Subphylum Sarcodine (amoebas). General characters and classification. Order Amoebida. Gender *Entamoeba*.

Topic 8 Apicomplexa (Sporozoa). General characters and classification. Class Sporozoea. Subclass Coccidia. Suborder Adeleina. Genus *Hepatozoon*. Suborder Eimeriina. General characters and classification. Family Eimeriidae: Genera *Eimeria* and *Isospora*. Family Cryptosporidiidae: Genus *Cryptosporidium*.

Topic 9. Suborder Eimeriina (continued). Family Sarcocystidae. General characters and classification. Genres*Toxoplasma, Besnoitia, Neospora* and *Sarcocystis*.

Topic 10. Suborder Haemosporin. General characters and classification. Family Plasmodidae: Genera *Plasmodium, Haemoproteus* and *Leucocytozoon*.

Topic 11. Subclass Piroplasmia. Order Piroplasmide. General characters and classification. Family Babesiidae: Gender *Babesia*. Family Theileriidae: Gender *Theileria.*

Topic 12. Phylum Ciliophora. General characters and classification. Family Balantidiidae: Gender *Balantidium*.

Topic 13. Phylum Microspora. General characters and classification. Order Microsporida. General characters and classification. Genera *Encephalitozoon* and *Nosema*.

Topic14. Phylum Myxozoa. General characters and classification. Class Myxosporea. General characters and classification. Study of genera of veterinary interest.

HELMINTOS (8 + 10 hours)

Topic 15. Helminths. General characters and classification. Phylum Platyhelminthum. General characters and classification. Class Trematoda. General characters and classification. Subclass Monogenea. General characters and classification. Study of genera of veterinary interest.

Topic 16. Class Trematoda (continued). Subclass Digenea. General characters and classification. Family Fasciolidae. Family Dicrocoelidae. Family Paramphistomidae. Family Schistosomatidae. Family Diplostomatidae. Study of genera of veterinary interest.

Topic 17. Class Cestoda General characters and classification. Order Pseudophyllidea. Family Diphyllobotridae. Order Trypanorhyncha. Family Gymnorhynchidae. Study of genera of veterinary interest.

Topic 18. Order Cyclophyllidea. General characters and classification. Family Mesocestoidae. Family Anoplocephalidae. Family Dipylidiidae. Study of genera of veterinary interest.

Topic 19. Family Taeniidae. Genera *Taenia* and *Echinococcus*.

Topic 20. Phylum Nemathelminthum. General characters and classification. Class Nematoda. General characters and classification. Subclass Secernentea. General characters and classification.

Topic 21. Order Rhabditida. Family Rhabditidae. Family Strongyloididae. Order Oxyuride. Family Oxyuridae. Study of genera of veterinary interest.

Topic 22. Order Ascarida. Family Heterakidae. Family Ascaridae. Family Ascaridiidae. Study of genera of veterinary interest.

Item 23. Order Strongylida. Superfamily Matastrongyloidea. Family Metastrongylidae. Family Protostrongylidae. Study of genera of veterinary interest. Family Angiostrongylidae. Family Crenosomatidae. Family Filaroididae. Study of genera of veterinary interest.

Topic 24. Order Strongylida (continued). Superfamily Trichostrongyloidea. Family Dictyocaulidae. Family Trichostrongylidae. Family Ollulanidae. Study of genera of veterinary interest.

Topic 25. Order Strongylida (continued). Superfamily Strongyloidea. Family Strongylidae. Family Chabertiidae. Family Syngamidae. Superfamily Ancylostomatidae. Study of genera of veterinary interest.

Topic 26. Order Spirurida. Superfamily Filarioidea. Family Onchocercidae. Subfamily Onchocercinae. Subfamily Setariinae. Subfamily Dirofilariinae. Study of genera of veterinary interest.

Topic 27. Order Spirurida (continued). Superfamily Habronematoidea. Superfamily Thelazioidea. Family Thelaziidae. Study of genera of veterinary interest. Superfamily Spiruroidea. Family Spirocercidae. Family Gongylonematidae. . Study of genera of veterinary interest.

Topic 28. Subclass Adenophorea. Order Enoplida. Superfamily Trichinelloid. Family Trichinellidae. Family Trichuridae. Study of genera of veterinary interest.

ARTROPODOS (5 hours)

Topic 29. Phylum Arthropoda. General characters and classification. Study of the species of interest as causes of disease and their role as transmitters of diseases (vectors). Class Pentastomide. General characters and classification. Family Linguatulidae. Study of the genres of interest.

Topic 30. Class Arachnida class. General characters and classification. Study of the suborders Prostigmata, Mesostigmata and Astigmata. Study of genera of interest in Veterinary Pathology.

Topic 31. Suborder Metastigmata. Family Ixodidae. Family Argasidae. Study of their role as transmitters or carriers of diseases. Study of the genus of greatest veterinary interest.

Topic 32. Class Insecta General characters and classification. Study of their role as transmitters or carriers of diseases. Study of the genus of greatest veterinary interest.

Topic 33. Order Hemiptera. Order Phtiraptera. Order Coleoptera. Order Siphonaptera. Role they play as carriers of diseases and study of the species of greatest interest.

Topic 34. Order Diptera. General characters and classification. Suborder Nematocera, Brachycera and Cyclorrapha. Study of the genres of greatest interest.

PRACTICAL TEACHING

The practical teaching of the subject of Parasitology is aimed at students acquire the skills and abilities necessary to know how to manage and understand mainly the diagnosis and also the epidemiology, pathogenesis and prevention of diseases produced by parasites (protozoa, helminths and arthropods) in domestic animals and animals of veterinary interest. To do this, the student must know the morphology and structure, taxonomy and systematics of parasite living beings that appear in the theoretical contents of the subject.

They must also know and understand the fundamentals of parasitological diagnostic techniques for later use.

They are structured in 10 sessions of 2 nominal hours each.

1ª. - Study of the fundamentals of parasitological diagnostic techniques. They will be carried out with a computer and other computer tools.

12 groups

2ª. - Study of the morphology of the Protozoa (I). Identification of the different taxonomic groups and the evolutionary stages of each group. They will be carried out with a computer and other computer tools

12 groups

3ª. - Study of the morphology of the Protozoa (II). Identification of the different taxonomic groups and the evolutionary stages of each group. They will be carried out with a computer and other computer tools and with a microscope.

24 groups

4ª. - Study of the morphology of the Cestodes. Identification of the different taxonomic groups and the evolutionary stages of each group. They will be carried out with a computer and other computer tools and with a microscope.

24 groups

5ª. - Study of the morphology of Trematodes. Identification of the different taxonomic groups and the evolutionary stages of each group. They will be carried out with a computer and other computer tools and with a microscope.

24 groups

6ª. - Study of the morphology of the Nematodes (I). Identification of the different taxonomic groups and the evolutionary stages of each group. They will be carried out with a computer and other computer tools and with a microscope.

12 groups

7ª. - Study of the morphology of Nematodes (II). Identification of the different taxonomic groups and the evolutionary stages of each group. They will be made with a computer and other computer tools and with a microscope.

24 groups

8ª. - Study of the morphology of insects. Identification of the different taxonomic groups and the evolutionary stages of each group. They will be carried out with a computer and other computer tools and with a microscope.

24 groups

9ª. - Study of the morphology of Mites. Identification of the different taxonomic groups and the evolutionary stages of each group. They will be carried out with a computer and other computer tools and with a microscope.

24 groups

10ª. - Presentation and evaluation of the practical work. Assessment of knowledge and skills acquired in practical classes

24 groups

Course planning and calendar

The dates and key milestones of the course are described in detail, along with the rest of the subjects of the second year in the Veterinary Degree, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradovet/plan.php). This link will be updated at the beginning of each academic year.

They will also be available in more detail through the ADD teaching platform (Blackboard 9.0).

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28417

Universidad Zaragoza

Year : 2018/19

28418 - Quantitative and molecular genetics in animal breeding

Syllabus Information

Academic Year: 2018/19

Subject: 28418 - Quantitative and molecular genetics in animal breeding

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 2

Semester: Second semester

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The aims of this course are to:

- Know the scientific bases of the disciplines that integrate animal genetic improvement.
- Know how to apply the methods and techniques of evaluation of reproducers in theoretical contexts.
- Know the formulation of improvement strategies in species of zootechnical interest.
- Integrate into programmes for animal genetic improvement, molecular genetics and conservation of genetic resources, being able to provide alternatives that improve the effectiveness of these programmes.
- Give genetic advice in pathologies of hereditary origin.
- Know the possibilities of application of transgenesis and gene therapy in veterinary medicine.

Context and importance of this course in the degree

Animal breeding is one of the fundamental pillars of animal production, allowing the genetic structure of livestock populations to be configured to achieve production objectives. In this context, animal breeding is the basis for the cost-effectiveness and sustainability of the production of food of animal origin.

This course aims to provide training in the disciplines on which animal breeding is based. The general objective is to train professionals who have the operational capacity to establish and evaluate animal breeding programmes.

From the methodological point of view, animal breeding is a broad and complex discipline in which disparate subjects come together. Its foundation lies in population and quantitative genetics, based on applied statistical techniques.

Until now, this information was constituted by the phenotypic manifestation of the genes involved and by the genealogical relationships between the animals in the population. This approach forms the basis of the current animal breeding programmes of companies and breeders' associations. On the other hand, molecular genetics, based on molecular biology techniques, is increasingly intervening in animal breeding programmes both from the point of view of genome observation and modification.

Recommendations to take this course

It is desirable that the student has acquired the skills relating to the basic training subjects of the first year and first four months of the second year. Those corresponding to Genetics and Statistics are considered especially necessary for their correct monitoring.

Competences and Learning outcomes

Competences

Student´s competencies after completing the course:

Generic transversal competences:

1. Ability to analyze and synthesize
2. Robustness in the basic knowledge of the profession
3. Oral and written communication.
4. Skills to retrieve and analyze information from different sources
5. Ability to pose and solve problems
6. Critical capacity and generation of new ideas
7. Propose and evaluate hypotheses
8. Relate and integrate concepts and ideas
9. Development of the sense of logic.
10. Ability to reason and interpret facts

Specific competences:

1. Analyze characters that intervene in an objective or selection criteria, with their factors, properties and limitations.
2. Make initial proposals for genetic improvement plans that are consistent with the proposed formulations.
3. Raise the genetic analysis of a character.
4. Understand, justify and propose new guidelines for genetic improvement and conservation.
5. Give genetic counseling.
6. To make proposals for the use of gene transfer in the veterinary profession.
7. Know the appropriate measures to estimate and control inbreeding levels.

Learning outcomes

If students complete the course successfully, they should be able to

1. Include the fundamentals of animal genetic improvement developed from productive, genealogical and molecular information.
2. Know the genetic analysis of the characters involved in the objectives and selection criteria.
3. Construct and interpreting results of genetic evaluation models of selection candidates using genealogical, phenotypic and molecular information.
4. Discern between basic alternatives oriented to the design of improvement plans in cattle breeds and selection schemes for specialized genetic lines.
5. Know the appropriate measures to estimate and control inbreeding levels.
6. Give genetic advice in pathologies of hereditary origin.
7. Learn the methodological bases and applications of gene transfer in Veterinary Medicine.

Importance of learning outcome

It allows to know the principles of the genetic improvement, as an element of the veterinary profession. In addition, it must provide skills for the approach of genetic evaluation models and information organization/treatment, promoting attitudes favorable to livestock associationism, performance control and technical innovation.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities...

1. Theory exam: Development of three essay-type questions during 1.5 hours (40 % of the grade) on the dates scheduled by the center at the end of the semester.
2. Problems: Resolution of three problems, posed in theoretical scenarios (30% of the grade) on the same date as the theory test.
3. Practices: We will deal with approaches that the students will have to solve individually (20% of the grade). The assessment will be carried out throughout the semester, once the corresponding practical sessions have been completed.
4. Seminars: To be held in groups, publicly presenting the specific results proposed to each (10% of the rating). The assessment will be carried out throughout the semester, once the corresponding seminars have been held.
5. Sections 1, 2 and 3 must be passed separately with at least a rating of 5.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

Learning tasks

The program includes the following activities (each unit involves two theoretical teaching sessions)

1. Theoretical lectures. In 30 sessions of 1 hour, to develop key concepts.
2. Problems. In 12 sessions of 1 hour, raised to solve theoretical situations.
3. Practices. 8 sessions of two hours in computer classroom supported with simulation programs freely available.
4. Seminars. In 2-hour sessions to analyze and discuss with professor different proposed situations.

Practices and seminars will be devoted to treat more than 40 modules developed PQGen Software freely available for this purpose with current issues in animal breeding.

The resolution of proposed cases is a non-presential activity for the student.

Syllabus

BLOCK 1. INTRODUCTION

Unit 1. An approach to animal breeding. Objectives and selection criteria.

Unit 2. Organization of genetic improvement. Associations and companies.

BLOCK 2. Genetic structure of a quantitative trait

Unit 3. Values, means and variances.

Unit 4. Numerator kinship, relationship between relatives, heritability and repeatability.

BLOCK 3. SELECTION

Unit 5. Components of the response to selection.

Unit 6. Selection indexes.

Unit 7. Correlated response.

BLOCK 4. COMBINATION ABILITY AND CROSSING

Unit 8. Inbreeding depression and crossing.

Unit 9. Selection for combining ability.

BLOCK 5. SELECTION FOR GENES AND MARKERS

Topic 10. Linkage disequilibrium and marker-assisted selection.

Unit 11. Genomic selection.

BLOCK 6. INHERITANCE OF DISEASES IN DOMESTIC ANIMALS

Unit 12. Hereditary diseases associated with single copy genes and a multigenic inheritance.

Topic 13. Control and eradication of hereditary diseases.

BLOCK 7. HANDLING CHANGES OF GENOME IN ANIMAL BREEDING

Topic 14. Transgenesis as a tool in Veterinary sciences.

Topic 15. Therapies based on the genetic modification and its applications in animal breeding.

Course planning and calendar

The dates and key milestones of the subject are described in detail, along with those of other subjects of the degree of Veterinary, on the website of the Faculty of Veterinary (link http://veterinaria.unizar.es/gradoveterinaria/). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28418

Universidad Zaragoza

Year : 2018/19

28419 - Animal Nutrition

Syllabus Information:

Academic Year: 2018/19

Subject: 28419 - Animal Nutrition **Faculty / School:** 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 2

Semester: Second semester

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The aim of this course is for students to acquire basic knowledge of the nutrients provided by foods and the factors that determine their digestive and metabolic use, in order to assess their efficiency of use. It also includes the definition and assessment of the needs of domestic animals in their different physiological phases and the analysis of the different feeding systems that allow them to be satisfied. It is intended that the achievement of these objectives will facilitate the understanding and construction of their own knowledge in the other disciplines of the degree.

In addition, the students are encouraged to participate actively in their learning process, involving them on it and moving them away from the mere role of passive observers.

Context and importance of this course in the degree

Knowledge of the nutritional value of food and of its digestive use to satisfy the nutritional needs of animals in their different physiological phases should be used to understand and establish feeding patterns that define the systems of rearing and production of animals in production, which will be taught *in* the 4th year subjects corresponding to the *Integrations in ruminants, pigs and birds and rabbits*, and which favour the correct development and welfare of pets and sport, addressed in the 4th year subjects corresponding to the *Integrations in pets, equids and aquatic and exotic animals*. Likewise, the knowledge and skills acquired may be applied in the corresponding *Practicum*, to be developed in the 5th year of the Degree.

Recommendations to take this course

It is recommended to have studied Biology and Biochemistry in the First Course of the Veterinary Degree, and Agronomy in the First Quarter of the Second Course. In addition, it is recommended to be enrolled in the subject of Animal Physiology (Second Course of the Degree in Veterinary Medicine). In this case, although this subject, of an annual nature partially coincides in time with that of Animal Nutrition (located in the 2nd quarter of the 2nd year), the knowledge acquired throughout the 1st quarter and simultaneously during the 2nd quarter, will contribute significantly to the understanding of the concepts of Animal Nutrition to be taught.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Identify and evaluate different foods, in terms of chemical composition and bromatological characteristics.
2. To estimate the components that determine the nutritional needs of domestic animals in their different physiological phases.

3. Understand the role of food in meeting the needs of animals, and in preventing metabolic or health problems.
4. Understand the impact of food on the quality of animal products.
5. To know the different systems of feeding of the domestic animals.
6. Make communication more correct and effective, both orally and in writing.
7. To improve the capacity for autonomous organization and planning of work and information management.

Learning goals

If students complete the course successfully, they should be able to

1. Have a basic knowledge of the nutrients provided by food, and is able to characterize and typify the main raw materials.
2. Understand the metabolic processes involved in the digestive utilization of foods, and is able to assess their utilization efficiency.
3. Have knowledge of determining the needs of animals in their different physiological phases.
4. Understand the methods and systems of food valuation and has basic concepts of its application to the satisfaction of the nutritional needs of animals.
5. This includes the influence of food on the quality of products of animal origin.
6. Work as a team, synthesize available information on a subject, present and substantiate his opinion on the subject and present it publicly, both orally and in writing.

Importance of learning outcome

The learning results contribute to the capacity of the students to face in better conditions the subjects included in the different Integrations by species. This will help the students to carry out their professional profile in farms and companies linked to animal production, as well as in the approach and resolution of clinical cases and the maintenance of optimal conditions of maintenance and development that guarantee the welfare of the animals. In addition, they will allow interrelation and teamwork with other professionals in the technical sciences (agricultural engineers, food technicians) or biomedical (doctors, biologists, ecologists).

On the other hand, the strengthening of the generic or transversal competences of instrumental type, of interpersonal and systemic relation will contribute, together with the rest of subjects, to the integral formation of the future Veterinary Graduates.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities:

1 Written assessment test: Theoretical knowledge will be assessed by means of a written test, which will be carried out in two partial examinations, each covering approximately half of the subject. The first written test, of a voluntary nature, will be carried out in the middle of the term, and the second at the end of the teaching term. The tests will consist, each of them, of a total of 25 questions covering conceptual issues, both short and 4 alternative and true/false, and 3 other practical case solution questions and problems of a methodological nature.

Passing this test will accredit the achievement of learning outcomes 1 to 5, and will be evaluated according to the criteria and levels of requirement described in the corresponding section. In the case of passing the first partial test with a score equal to or higher than 5 out of 10, the student may appear in the two official announcements of the subject only to the second assessable part; otherwise, must do so for the entire subject. The final grade of the written tests will be from 0 to 10, and will suppose 80% of the final grade of the student in the subject. The total duration of this written test will be about 3 hours.

2 Individual work: The individual written submission of a report on the nutritional value of a conventional ingredient in animal feed shall be evaluated. Passing this test will accredit the achievement of learning outcomes 1, 2, 4 and 5, and will be evaluated according to the criteria and levels of requirement described in the corresponding section. The grade will be from 0 to 10, and will be 5% of the student's final grade in the subject.

3 Teamwork 1: The written submission of a report on the nutritional value of various commercial small animal feeds will be assessed on the basis of their declared chemical composition, which the pupils will prepare in groups of 2

students. Passing this test will accredit the achievement of learning outcomes 1, 2, 4 and 6, and will be evaluated according to the criteria and levels of requirement described in the corresponding section. The grade will be from 0 to 10, and will be 5% of the student's final grade in the subject.
4 Teamwork 2: In addition to the previous work, a test will be evaluated regarding the practices carried out, with groups of 2-3 students, considering also the individual attendance to the practical classes. Passing this test will accredit the achievement of learning outcomes 1, 2, 3, 4, 5 and 6, and will be assessed according to the criteria and levels of requirements described in the corresponding section. The grade will be from 0 to 10, and will represent 10% of the student's final grade in the subject.

Valuation criteria and requirement levels

- **Written final assessment test:** a minimum score of 4.5 out of 10 is required.
- **Teamwork 1:** Clarity and precision in the use of language will be valued, as well as the ability to synthesize and the relevance of the contents.
- **Individual work:** the understanding of the concepts acquired in the practices and their application to a specific case will be valued.
- **Teamwork 2:** The work done will be valued, applying the same criteria as in points 2 and 3. In addition, attendance at practical classes will be considered.

The assessment of individual and team work 1 and 2 (points 2, 3 and 4) will only be considered for the grade of the subject if in the final written test, a minimum grade of 4.5 points out of 10 has been obtained. In order to pass the subject, it will be necessary to obtain a minimum final grade of 5 out of 10.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process designed for this subject is based on an in-person attendance part, which will be structured in 42 lectures 50 minutes length, and 18 practical classes, divided in 10 classes of practical nutrition cases to be resolved in class (5 sessions of 2 hours), 6 hours of practice in laboratory and 2 h of databases management in computer.

The list of topics included in the theory program is divided into two sections, Nutrient evaluation and Requirements, with 28 and 14 h, respectively. Associate documentation (including concepts in theory, examples and supporting graphics and images) will be available for the students one week in advance, by means of the ADD. Classes of practical cases will include problems to be solved in group, to give support to the theory concepts giving in class. Laboratory practices will consist on microscopy inspection for identification of ingredients in feed, and will be combined with basic notions of management of tables of requirements and nutrient databases.

Learning tasks Syllabus

1: Lecture classes:

Lesson 1. Concept of Nutrition. Bases and objectives of animal nutrition. Chemical composition of feeds and animal body. (1 h)

Lesson 2. Feeds 1. Classification based on chemical composition. Components of plant cell content and cell wall. Fibrous feeds. Feeds rich in non-structural carbohydrates. (2 h)

Lesson 3. Feeds 2. Nitrogen-rich vegetal and animal feeds. Fats. (2 h) Lesson 4. Feeds 3. Vitamines. Minerals. Additives. (2 h)

Lesson 5. Rumen microbial ecosystem. Microbiology. Microbial degradation of fibre. Protein utilization. Rumen biohydrogenation of fatty acids. (2 h)

Lesson 6. Digestibility. Digestibility in different sites of the digestive tract. Apparent and real digestibility. Methods of determination. (1 h)

Lesson 7. Factors affecting digestibility. Composition, associative effects, effect of feed processing. Animal species, physiological stage, level of feeding. (2 h)

Lesson 8. Energy evaluation. Energy partition of feeds. Physiological combustion values. (1 h)

Lesson 9. Utilization of metabolizable energy for different physiological functions: factors. Energy costs of fat and protein synthesis. Energetic efficiency of storage and mobilization of energy reserves. (2 h)

Lesson 10. Energy evaluation systems for monogastric animals. Systems based on digestible, metabolizable or net energy. Predicting energy value of feeds. (1 h)

Lesson 11. Energy evaluation systems for ruminants. British system and variable net energy system. INRA system. NRC system. (3 h)

Lesson 12. Protein evaluation for monogastric animals. Concept of limiting aminoacid. Aminoacid availability and estimation. Evaluation methods. (1 h)

Lesson 13. Protein evaluation for ruminants. Potential and effective rumen degradability of protein. Factors affecting protein rumen degradability. (1 h)

Lesson 14. Microbial protein synthesis: efficiency and factors affecting. Protein-energy interactions in ruminants. Value of protein reaching the duodenum. (1 h)

Lesson 15. Protein evaluation systems for ruminants. ARC systems. INRA system. CNPS system. (2 h)

Lesson 16. Voluntaryfeed intake. Intake regulation in monogastric and ruminant animals. Potential feed intake and ingestibility. Factors affecting feed intake. (1 h)

Lesson 17. Estimation of voluntary intake. Factors affecting feed intake. Fill units and rumen fill value. (2 h)

Lesson 18. Requirements and nutrient input. Energy requirements for maintenance. Basal and fasting metabolism. Energy cost of activity in animals. (1 h)

Lesson 19. Environmental effect on energy needs for maintenance. Thermoregulation. Interval of neutral temperature. Critical and critical effective temperature. (1 h)

Lesson 20. Protein requirements for maintenance. Faecal metabolic nitrogen and urinary endogenous nitrogen. Methods of determination. (1 h)

Lesson 21. Growth and development in the different animal species. Body composition and feeding. Compensatory growth. (2 h)

Lesson 22. Energy and protein requirements for growth and fattening: monogastric and ruminant animals. Factors affecting energy and protein requirements for growth and fattening. (3 h)

Lesson 23. Reproduction. Requirements of reproductive females in the different animal species. Requirements of reproductive males during mating periods. Requirements for egg production. (2 h)

Lesson 24. Requirements in pregnancy. Growth of gestating uterous and phoetal nutrition. Effects of the level of feeding on different stages of pregnancy. Particularities of the different species. (2 h)

Lesson 25. Lactation. Origin of milk components. Factors affecting milk production and composition. Energy and protein requirements of the milking cow. Effects of feeding on milk production and composition. (3 h)

2: Practical classes:

Identification of feeds. Feed microscopy. (6 h)

Management of software for feed rationing (Winfeed) (2 h)

(Solving practical cases/nutrition problems) - 2 Groups per session, 5 sessions of 2 h

- Nº hours/student: 10

Course planning and calendar

The schedule and main features of the subject will be described in detail, together with the other subjects of the Degree in Veterinary Science, in the web page of the Faculty of Veterinary Science (http://veterinaria.unizar.es/gradoveterinaria/). Such link will be actualized at the start of the course.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28419

Universidad Zaragoza

Year : 2018/19

28435 - Ecology and the Environment

Syllabus Information

Academic Year: 2018/19

Subject: 28435 - Ecology and the Environment

Faculty / School: 105 – Faculty of Veterinary

Degree: 451 - Degree in Veterinary Science

ECTS: 3.0

Course: 2019-20

Semester: First semester

Subject Type: Optional **Module:** ---

General information

Aims of the course

The course provides the basic contents of Ecology and the Environment and the necessary vision for its use in the different areas of the veterinarian's professional development http://titulaciones.unizar.es/veterinaria/descripcion_detailed.html,

In the Ecology field, the purpose of the course is that students know the abiotic and biotic factors and interactions that explain the abundance and distribution of organisms and the functioning of the following levels of organization of life: populations, communities, ecosystems, landscape-territory and biosphere.

As far as the Environment is concerned, some problems will be tackled, such as climate change, problems deriving from pollutants coming from livestock farming, etc.

All this will allow: (i) address the resolution of environmental problems by reference to the functioning of natural systems; (ii) become aware of Global Change and of the bases provided by Ecology to mitigate it;

(iii) address scientific problems in the ecology field through the rigorous application of the scientific method.

Context and importance of this course in the degree

The subject is linked to numerous subjects of the Veterinary Degree such as the aforementioned Epidemiology and Biostatistics, Agronomy, Toxicology, Parasitology and Wildlife.

It should be noted that Ecology is a scientific discipline and is not the same as the Environment. Ecology aims to know the abundance and distribution of organisms and their interactions with each other and with the environment. The Environment is a scientific-technical discipline that aims to solve environmental problems in the natural environment most directly transformed by humans.

Recommendations to take this course

It is highly recommended to attend theoretical and practical classes, to document yourself before going to classes, to work throughout the four-month period, to organize your own individual work time and to take advantage of the tutorials with the teachers of the subject. For the best monitoring of the subject it is recommended to have passed the following subjects: Epidemiology, Biostatistics and Biochemistry. The field practices imply the fulfillment of the rules of the Ecology Area that appear in the Moodle platform of the subject.

It is also convenient to have a basic knowledge of English for the comprehension of technical and scientific texts and to have the equipment for field work.

Competences and Learning outcomes

Competences

Cross-cutting generic competences

Students must know how to apply their knowledge to their work or vocation in a professional manner and possess the

skills that are usually demonstrated by developing and defending arguments and solving problems within their area of study.

They must have the ability to gather and interpret relevant data to make judgments that include a reflection on relevant social, social, scientific or ethical issues.

To be able to transmit information, ideas, problems and solutions to a specialized public or not. Generic competences

C1. Analyze, synthesize, solve problems and make decisions in the professional areas of the veterinarian.

C6. Search and manage information related to the veterinarian's activity.

C7. To know and apply the scientific method in professional practice including evidence-based medicine.

C8. Know how to get professional advice and help.

C10. Have a basic knowledge of a second language, especially in technical aspects related to Veterinary Sciences.

C11. To be aware of the need to keep the knowledge, skills and attitudes of professional competences updated through a process of continuous training.

Specific competences

CCSA18 Zoonoses and Public Health

CCSA20 Technical measures and regulations for the prevention, control and eradication of animal diseases.

PA08 Sustainable development

HTSA12 Dynamics and demography of infection and intoxication HTSA13 Epidemiology and diagnosis

HTSA14 Monitoring and surveillance system.

Learning outcomes

If students complete the course successfully, they should be able to

1. Evaluate and interpret the role of abiotic factors in the structure and functioning of ecological systems at different levels of organization.
2. Recognize in the field the cycle of organic matter in terrestrial ecosystems. Identifies key ecosystem services
3. Know critically the main syndromes of Global Change Analyzes ecological information critically.
4. Know the meaning and applies the methods for estimating biological diversity.
5. Interpret communities and ecosystems over time, incorporating the concept of disturbances.

Importance of learning outcomes

The learning results obtained will make possible to address the understanding of environmental problems and interactions produced by the main human activities, taking as reference the functioning of natural ecosystems and knowing the framework of Global Change.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student, in order to pass the course, will have to show his competence in the following activities.

The assessment will be comprehensive and will consist of a written test with multiple-choice questions with only one right answer. This written test will represent 90% of the total score.

Teamwork on relevant questions related to the subject. It will be delivered as a written report. The degree of clarity, and precision in language use, content relevance, synthesis capacity and references quality, will be evaluated. The evaluation of this report will represent 10% of the total score.

Methodology, learning tasks, syllabus and resources

Methodological overview

Participative master lectures. Practical lectures will be devoted to the recognition of theoretical aspects in the field and in the classroom.

Learning tasks

The subject implies a dedication of 75 hours of work by the student: 15 hours of master lectures; 4 hours of practical lectures in a classroom; 11 hours of special practices; 40 hours of study and autonomous work and 3 hours of evaluation.

Syllabus

Theory program

Participative theory lectures in which students pose doubts regarding the information they have received previously by the teacher. This information is available on Moodle platform since the beginning of the term.

Week 1. Ecology 1. Introduction.

Week 2. Ecology 2. Populations.

Week 3. Eco 3. Communities.

Week 4. Eco 4. Ecosystems.

Week 5. Eco 5. Conservation Biology.

Week 6. MA 1. Abiotic Environmental Impact.

Week 7. MA 2. Biotic Environmental Impact and Environmental Education.

Week 8. MA 3. Environmental Microbiology.

Week 9. Global assessment.

Practices program

Week 3. Demography.

Week 5. Practice in the field 1. Natural Environments

Week 6. Environmental Education.

Week 7. Practice in the field. Extensive farming and Natural Environments.

Course planning and calendar

Calendar, timetable, tutorials and exams will be adjusted to the general academic calendar of Zaragoza University and its Faculty of Veterinary.

The information on the subject will be available on Moodle platform from the beginning of the course.

Calendar of face-to-face sessions.

This subject implies an average dedication of 75 hours by the student:

Lectures	15
Practice Sessions	4
Fieldwork	11
Study and autonomous work	40
Assessment	2
Total	75

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28435

Universidad Zaragoza

Year : 2018/19

28420 - Pharmacology and Drug Therapy

Syllabus Information

Academic Year: 2019/20

Subject: 28420 - Pharmacology and Drug Therapy

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 9.0

Year: 3

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The fundamental goal will be that students acquire the appropriate basic training for the use of the different drugs, which in turn will serve for the understanding and analysis of other clinical disciplines of the veterinary degree.

Context and importance of this course in the degree

The contents of pharmacology, pharmacy and pharmacotherapy in the context of the veterinary degree will have importance in a large part of the professional actions of the veterinarian that involve the use of drugs.

The knowledge acquired in previous courses from disciplines such as basic Sciences for Veterinary Medicine, Biology and Biochemistry, Parasitology, Animal Physiology and Microbiology will facilitate the understanding of its contents.

Recommendations to take this course

It is necessary to have knowledge of subjects from previous grade courses such as:

1. Basic Veterinary Sciences
2. Animal Physiology
3. Microbiology
4. Parasitology
5. Biology and

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1: Specific:

- Know the general pharmacological bases**.**
- Know the pharmacological aspects and to study the different types of drugs. To know the basics of pharmacotherapy.

2: Transversal

- 1.-Have the capacity for analysis and synthesis 2.-To take decisions
- 3.-Teamwork

- 4.-Solve problems
- 5.-communicate with people who are not experts in the field
- 6.-Be critical and self-critical

Learning outcomes

If students complete the course, they should be able to

1. Describe and interpret the meaning of the main pharmacokinetic parameters of the one-compartment model.
2. Relate the evolution of the drugs in the organism with its consequences in the effectiveness of a treatment.
3. Classify the drugs according to their relationship with the different receptors, and explain the interactions that can occur between them and their consequences.
4. Recognize the adverse reactions that drugs can produce, assess them and, if necessary, propose measures to reduce them.
5. Differentiate the pharmaceutical forms of presentation of a medicine and choose the most appropriate according to the desired effects.
6. Know the pharmacological and therapeutic bases of the drugs with action on microorganisms; on the central and peripheral nervous system; on the cardiovascular, respiratory, digestive and hormonal systems and on the dermal processes.
7. Apply the general basis for the establishment of an adequate pharmacological treatment.
8. Calculate the amount of a drug that needs to be given to a patient to achieve the goal of a drug treatment.
9. Select the best treatment for the resolution of a health problem in a patient.
10. Know the regulations that affect the use of drugs in animals, and to adapt their actions to them.

Importance of learning outcomes

These learning results allow the student, together with the rest of the competences acquired in Chemistry, Physiology, Parasitology and Microbiology, to be trained to deal with the specific aspects in medical and surgical treatments that will have subsequent application in the veterinary training profile and in their subsequent professional profile.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

1: Evaluation of the knowledge acquired with respect to theoretical teaching, which includes that acquired in theoretical classes.

Two written tests will be carried out (first partial and second partial), the first corresponds to the section of General Pharmacology and Pharmacology of Infectious and Parasitic processes, and the second to the section of Nervous System and Organs and Systems.

Both tests will consist of 50 multiple-choice questions with four alternatives answers with only one right answer, graded with 1 the right answers, 0.33 negative points for wrong answer and 0 points per unanswered question. Passing these tests will accredit the achievement of learning outcomes 1 to 10 and globally account for 70% of the final grade.

2: Assessment of laboratory sessions. Written final assessment test of the knowledge acquired in all the practical sessions. This examination will be carried out together with the examination of the first partial and will consist on the resolution of problems and of multiple choice questions of similar characteristics to those indicated in the theoretical teaching tests, which allow reaching in total a maximum of 10 points (10% of the final grade). Passing these tests

accredits the achievement of learning outcomes 1, 2, 3, 5 and 8, and of transversal competence 4.

3: The assessment of the special therapeutic practices will be carried out through the report presented by each work team and the continuous assessment of the tutor assigned to each group. The score of these practices is 20 points (20% of the final grade) and accredits the achievement of learning outcomes 1, 2, 3, 5 and 8, and of transversal competence 4.

4: The first and second partial assessment tests will take place on the dates indicated in the examination schedule drawn up by the centre.

5: Global test

Students who do not attend either classes or practices (laboratory and seminars) may take a multiple-choice questions final exam of the whole subject (theory, practices and the rest of the training activities). The exam will be written and will consist of 130 multiple-choice questions with only one right answer. The grade will be 1 point for right answer, 0.33 negative points for wrong answer and 0 points for not answered question.

Valuation criteria and requirement levels

1: Continuous evaluation:

The student's final grade will be obtained from the weighted sum of three parts,

THEORY

It corresponds to 70% of the student's final grade.

You will score on two separate tests, each consisting of 50 questions, with a value of 1 point per question. The first will correspond to the sections of General Pharmacology and Chemotherapy (to be carried out in February) and the second to the section of Organs and Systems (to be carried out in June).

These exams are considered computable when a minimum score of 25 points is obtained in each one of them, otherwise they do not grant any qualification, and must be repeated until this score is reached in subsequent sessions.

A student with 100 points out of 100 would get 7 points for his final grade. The minimum required (50 points on100) would get 3.5 points for his final grade.

THERAPEUTIC PRACTICES

It corresponds to 20% of the student's final grade.

They will take place during the second quarter and will be graded globally on 20 points. The tutor of each group will be in charge of assessing the report presented at the end of the internship according to the criteria set out in the Teaching Guide. A minimum of 10 points will be required to pass this section.

INTERNSHIPS AND SEMINARS

It corresponds to 10% of the student's final grade.

It will consist on the realization of a qualified examination on 10 points to realize together with the first partial. Following these criteria, a student's final grade will be obtained by applying the following equation: FINAL NOTE = (0.7 x THEORY) + (0.2 x PRACT. TERAP.) + (0.1 x. LAB.SESSION)

The grades obtained will be valid throughout the academic year.

2: Overall evaluation:

The overall examination will be graded on 130 points, and will be passed with a minimum score of 87 points.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The course is structured in two general topics: (a) Pharmacy and Pharmacology and (b) Pharmacotherapy, developed according to the following criteria:

a. 90 classroom hours:

- 60 hours of lectures.
- 16 hours of laboratory sessions.
- 5 hours of seminars.
- 7 hours of special therapeutic practices.
- 2 hours of supervised work.

b. 135 hours of autonomous work:

Lectures are h the classroom with students divided in two groups.

Four seminars will be organized (one hour for session) and will be based on clinical cases.

The laboratory work will consist of four sessions: (a) routes of administration and dose calculation, (b) pharmacokinetic and dosage forms, (c) pharmacodynamics I and (d) Pharmacodynamics II. They will be conducted in the laboratory of Pharmacology, in groups programmed by the center, within the first semester of the academic year. Initially, an explanation of the session will be done. Subsequently, students will practice under the supervision of teachers. Students will be provided with noteworks and specific materials for the practice. Laboratory dressing and the use of personal protective measures are required by the University.

Special therapeutic practices will be carried out with the approval of the Ethical Committee for Animal Welfare. They will be held throughout the second quarter and will include tutorials in groups of 6 students and the final submission of a written report. The appropriate clinical clothing (sanitary dress) is required.

Learning tasks

Lectures, 60 hours

Laboratory practical classes, 16 hours

Seminars, 5 hours

Special therapeutic practices, 7 hours.

Supervised work, 2 hours.

Syllabus

The contents of each of these thematic blocks are presented in the program is detailed below:

Lecture topics:

1- Introduction to Pharmacology. The concept of Pharmacology, basic principles and its relation with other disciplines.

2- Drug transport and passage across membranes. Transport through channels, active transport, facilitated diffusion, absorption, aqueous diffusion of water-soluble drugs.

3- Pharmacokinetics I. Absorption and distribution. Routes of administration. The concept of distribution. Binding to plasma and serum proteins. The blood-brain barrier and the placenta. Factors affecting drug distribution. Volume of distribution.

4- Pharmacokinetics II. Drug metabolism. Pharmacological significance of metabolism. Site of biotransformation. Metabolic pathways: synthetic and non-synthetic. Factors affecting drug metabolism: physiological, pathological and pharmacological factors.

5- Pharmacokinetics III. Drug excretion. General mechanisms of excretion and factors affecting drug excretion. Renal excretion. Liver-biliary excretion. Other excretion routes.

6- Pharmacokinetics IV. Compartmental analysis model. Concepts and variables.

7- Mechanism of drug action. Pharmacodynamics concepts. Drug receptors. Drug-receptor relationship. Concepts: Affinity and intrinsic activity. Dose-response curves. Agonist and Antagonist.

8- Drug interactions. Concepts and modifications. Synergy and antagonism. Pharmacodynamic and pharmacokinetic interactions.

9- Toxicity and drug side effects.

10- Gene therapy.

11- Pharmacy. Type of drugs, dosage forms. Bioavailability and bioequivalence.

PHARMACOLOGY AND CHEMOTHERAPY OF MICROBIAL DISEASES AND PARASITIC INFECTIONS.

12- Introduction. General concepts. Classification and mechanism of action. Bacterial resistance to antimicrobial agents. Selection of an antimicrobial agent and therapy with combined antimicrobial agents. Toxicity and undesirable side effects. Chemotherapy: safe use of drugs in veterinary.

13- Antiseptics and disinfectants. General concepts. Classification. Pharmacological characteristic of the most commonly used antiseptics: alcohols, phenols, detergents, oxidizing agents, chlorhexidine.

NOTE: In each of the following lectures (14-21), will be included: Chemical structure, classification, mechanism of action, spectrum of activity, resistance, pharmacokinetics, toxicity and side effects, interactions and indications.

14- Sulfonamides and diaminopyridines

15- Antimicrobial drugs affecting bacterial cell wall. I. Beta-lactams antibiotics: penicillins, cephalosporins, monobactam, carbapenems, beta-lactamase inhibitors. II.

16- Antimicrobial drugs that affect the bacterial protein synthesis. I. Aminoglycosides. II Tetracyclines. III. Phenicols. IV. Macrolides, V. Lincosamides.

17- Antimicrobial drugs that inhibit the nucleic acid synthesis. I. Quinolones. II. Nitrofurans. III. Nitroimidazoles., IV Rifamycins.

18- Other antibacterial drugs.
Polymyxins, Novobiocin.

19- Antifungal drugs. I. Topical use. II. Systemic use.

20- Antihelmintic drugs. I. Drugs against nematodes. II. Drugs against cestodes. III. Drugs against trematodes.

21- Anticoccidial drugs

PHARMACOLOGY OF THE NERVOUS SYSTEM

22- Autonomic Nervous System. Neurotransmission. Drugs acting on the autonomic nervous system.

23- Adrenergic Pharmacology: sympathomimetic and sympatholytic drugs.

24- Cholinergic Pharmacology.

25- Autacoids: Histamine, antihistamines. Other autacoids.

26- Central Nervous System stimulant drugs: analeptics.

27- Non-narcotic analgesic drugs.

28- Narcotic analgesic drugs.

29- Local anesthetic drugs.

30- Neuroleptic drugs.

31- Inhaled anesthetic drugs.

32 - General anesthetic drugs: barbiturates, dissociative drugs, steroids drugs and other drugs with application in general anesthesia.

PHARMACOLOGY OF ORGANS AND SYSTEMS

33 - Cardiac pharmacology.

34 - Vasodilator and vasoconstrictor drugs.

35- Hemostatic and anticoagulant drugs.

36- Fluid Therapy.

37- Diuretic drugs.

38- Airway pharmacology: antitussive, mucolytic and bronchodilator drugs.

39- Gastric pharmacology.

40- Digestive pharmacology: laxative and purgative drugs. Protectors. Adsorbents, Astringents. Drugs

modulating intestinal activity.

HORMONE PHARMACOLOGY

41 - Drugs acting on the reproductive system: steroid and protein hormones. Gonadotropins. Uterine muscle relaxant and oxytocic drugs.

42- Hormones affecting metabolism: Thyroid, Parathyroid, insulin and pancreatic hormones.

43- Corticosteroids therapy.

PRACTICAL PROGRAM

A. Laboratory

Ten students per group (groups organized by the center):

1. Routes of administration and dose calculation.
2. Pharmacokinetics and dosage forms.
4. Pharmacodynamics. In vitro methods I.
5. Pharmacodynamics. In vitro methods II.

B. Special therapeutic practices.

Laboratory time, personalized tutoring and supervised work.

C. Seminars

1. Hormone Therapy.
2. Cardiovascular Therapy.
3. Fluid Therapy.
4. Pain, sedation and tranquilization.

Course planning and calendar

Calendar of meetings attendance and presentation of works: The dates and key points of the course are described in detail, along with the other subjects in the third course in the Degree of Veterinary Medicine at the website of the Faculty of Veterinary Medicine (http://veterinaria.unizar.es /gradoveterinaria/). This information will be updated at the beginning of the academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28420

Universidad Zaragoza

Curso : 2018/19

28421 - General surgical pathology, surgery and anaesthesiology

Syllabus Information

Academic year: 2018/19

Subject: 28421 - Patología quirúrgica general, cirugía y anestesiología

Academic centre: 105 Veterinary Faculty

Science Degree: 451 Degree in Veterinary Science

Credits: 7.0

Course: 3

Teaching period: Annual

King of subject: Compulsory

Module: ---

General information

Aims of the course

This subject and its expected answer to the following propositions and aims:

Objectives of this subject are:

The knowledge of the diseases and injuries in which surgery may be indicated as a therapy, including emergencies and the impact of the surgical procedure on the patient's body (Surgical Pathology).

The knowledge of surgical therapy with its protocols and techniques, as well as the acquisition of basic manual skills that are used in any surgical act (Surgery).

The mastery of clinical anesthesiology, from pre-anaesthetic evaluation to post anaesthetic care, including general and loco-regional anesthesia guidelines and patient monitoring in order to prevent, detect and treat complications that may arise during anesthesia.

Context and importance of this course in the degree

A part of the diseases and injuries that afflict our patients have a surgical treatment. It is necessary to know them and also to learn everything related to surgical therapy, both conceptually and practically, which means knowing the patient's response to the surgical act as a way to guide our actions in the peri-operative period and reduce complications.

Basic manual skills must also be acquired to carry out these treatments with minimal injury and sequelae for the patient. Finally, our course teaches how to anesthetize and use analgesics in patients who will undergo surgery or who suffer pain from other origins.

All these knowledge and skills, together with those acquired and completed in the rest of the third year clinical subjects in the different species, along with the fourth year integration subjects and with the fifth year Clinical Practicum, will establish the foundations for the exercise of clinical veterinary medicine.

Recommendations to take this course

In order to take this course it is recommended to have passed all the basic training subjects of the first two courses, especially Embryology and Anatomy, Cytology and Histology and Physiology.

It is also recommended to review, before beginning the study of anaesthesiology, the knowledge of pharmacology related to anaesthesia and analgesia, which will be taught in advance in the subject of Pharmacology and Pharmacotherapy, also in the third year.

It is also of great importance to complete the knowledge of this subject with those acquired in the subjects of General Pathology, General Pathology and Propedeutics and Diagnostic imaging.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Carry out a complete preoperative clinical evaluation of the individual to be operated on.
2. Indicate, perform and interpret methods and procedures of clinical examination and complementary diagnostic techniques.
3. Indicate and carry out basic surgical techniques used in veterinary medicine.
4. To anaesthetize the animals attending them adequately during the whole recovery period, with special attention to pain.

Learning outcomes

If students complete the course successfully, they should be able to:

1. Understand the patient's body's response to trauma, especially surgical trauma, both locally and systemically.
2. Explain the main complications derived from surgical treatment, how to recognize them, prevent them and treat them by means of adequate peri-operative care.
3. Recognize and handle basic surgical instruments and materials.
4. Know and apply the protocols for preparing a surgical intervention (surgical field, preparation of the operating room, instruments and material and preparation of surgical personnel).
5. Perform basic surgical techniques correctly (incision, dissection, suture, haemostasis).
6. Know the basic surgical techniques for the resolution of diseases or injuries of domestic animals, both those involving soft tissues and those of traumatology and orthopedics.
7. Assess the anaesthetic risk presented by a given patient.
8. Understand the theoretical and practical bases of clinical anaesthesia, both general and local-regional.
9. Monitor the anaesthetised patient correctly and interpret the results in order to detect and treat the most common anaesthetic complications.
10. Design anesthesia guidelines suitable for the different species and clinical situations.
11. Recognise pain in the anaesthetised patient and in the post-operative period, designing analgesia guidelines adapted to each case.

Importance of learning outcomes

These learning results allow the student, together with the rest of the skills acquired in other clinical subjects, to lay the foundations for the practice of clinical veterinary medicine in general and especially in the field of companion animals, equines and exotic animals, in which a large part of the daily clinical work of the veterinarian is carried out within the field of surgical pathology, surgery and anaesthesiology.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities:

Evaluation of the theoretical content: 60 points out of 100

By means of two written tests, at the end of each four-month period, each consisting of a maximum of 60 questions, along with the conventional June and September calls. It assesses learning outcomes 1, 2, and 6 to 11. They can be:

1. Short or longer answer questions (no penalty for wrong answer and 60% to pass).
2. Multiple choice questions, either of the True or False type (4 answers), or of the classic type of 4 answers with only 1 right (it is necessary to obtain 7.5 out of 10 in order to pass). Same with 5 answers with 1 right (needing to get 6.5 out of 10 to pass).
3. The evaluation may be oral if student and teacher agree.

Evaluation of the practical content: 40 points out of 100

- Surgery Practices. 20 points out of 100

Evaluates learning outcomes 3, 4 and 5.

- Examination during the practical lessons. 4 points out of 100

CIR 1, CIR 3 and CIR 4:

The theory of Surgery and its practices are taught in the first 9 theoretical sessions. Afterwards, the Surgery practices will be started. In Moodle, students will have some Surgical Practice Objectives in the form of questions (about 150). Students must prepare these questions, based on the theoretical content taught in class. In CIR1, and before starting the practice, an examination of these contents will be carried out, in the form of a question to be developed. Likewise, at the beginning of CIR3 and CIR4.

In the practices the handling of the instruments is taught, position of hands, placement of gloves, etc. Internship time is not always enough to acquire the necessary skills. Individualized non-attendance tasks will be proposed in the practice, which the student will have to prepare at home for the next practice. The student's interest and progression in these subjects will be valued.

CIR 2 and CIR 5:

Students will be evaluated during the CIR 2 practice based on their achievement.

The students will be evaluated at the beginning of the CIR 5 practice in order to check whether they have prepared the practice with the documentation available in Moodle for this purpose.

- Practical examination: surgery "stands". 16 points out of 100

In the June and September calls, there will be an evaluation of the skills acquired in the practical sessions of surgery, by means of a test that will consist of several "stands" in which the student will have to carry out some of the protocols or techniques corresponding to the different practical sessions.

- Anesthesia practices. 20 points out of 100 Evaluates learning outcomes 7 to 11.

- Practical examination of anesthesia "seminars". 4 points out of 100

Students must prepare the content of the anesthesiology practices to attend them having reviewed the previous theoretical knowledge. For this purpose, the objectives of the internships, as well as additional material and sample questions, will be available in Moodle and will be evaluated together after the seminars and practical workshops, before the clinical session, through self-evaluation in Moodle.

- Practical examination anesthesia "stands". 16 points out of 100

In the June and September sessions, there will be an evaluation of the skills acquired in the practical sessions of anaesthesia by means of a test that will consist of several "stands" in which the student will have to carry out one of the protocols or techniques corresponding to each session.

Valuation criteria and requirement levels

The grade for each of the evaluation activities will be valid only for the current academic year.

In order to pass this subject it is necessary to obtain half of the points, once added the points obtained in each one of these activities.

Out of 100 points:

Theoretical test: 60 points. A (50 - 75% depending on the type of question).

Practical test: 40 points. In order to pass, at least 20 points are required.

20 points assigned to surgery (4+16)

20 points assigned to anaesthesia (4+16)

Practical tests of surgery and anaesthesia stands must be approved separately in order to be averaged.

Marking system:

According to the national regulation Law 1025/2003, 5th of September, which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that has been designed for this subject is based on....

40 theoretical sessions

Five practical sessions of surgery (17 hours):

- 1 surgery practice session of 2 hours
- 1 surgery practice session of 4 hours.
- 1 surgery practice session of 4 hours
- 1 surgery practice session of 4 hours.
- 1 surgery practice session of 3 hours.

Five practical anesthesia and resuscitation sessions (13 hours):

- 1 practical session on: VPO and pre-anesthesia (2.5 hours)
- 1 practical session on: Induction, intubation and anesthetic machine. (2 hours)
- 1 practical session on: Anesthetic maintenance. Monitoring and complications (2.5 hours).
- 1 practical session on: loco-regional anesthesia (3 hours).
- 1 practical session on clinical anaesthesia (3 hours).

The theoretical sessions will last 50 minutes and will be given in the classroom with the students in the groups organised by the Centre.

The practical surgery sessions will take place in the surgery teaching laboratory and in the teaching operating room located in the hospital (Large Animal area, Operating Room 5). There will be 5 sessions dedicated to the knowledge and handling of surgical instruments and material, to the protocols for preparing a surgical intervention and to learning basic surgical techniques (incision, dissection, suture, haemostasis), as well as the main surgical approaches.

In order to complete the learning of surgical techniques, the student will be guided in an individualized way about non-presential activities and exercises to be carried out for this purpose.

Anesthesia and resuscitation practices will take place in the hospital's operating rooms and hospitalization rooms. The clinical session will take place in the hospital operating theatres, with real patients under anesthesia.

Learning tasks

The program offered to the student to help him/her achieve the expected results includes the following activities:

Summary table of teaching-learning activities

PLANNED ACTIVITIES	Presential	Table of Contents	Non-presential*	Total
Theoretical classes	40	1,5	60	100
Anesthesia practices	13			31
Practical preparation. Post-operative control and clinical case work anesthesia		1,28	18	
Practical surgical techniques	17			33
Non-presential surgical training		1	16	
Tutorials			3	3
Evaluation	0	--	8	8
Total	70	--	105	175

*According to University regulations

Syllabus

THEORETICAL PROGRAMME 40 sessions in which the following agenda will be addressed:

Unit 1. Subject presentation

Unit 2: Surgical instruments, suture materials, electrosurgery.

Unit 3: Surgical asepsis, sterilization and disinfection, maintenance of the surgical environment.

Unit 4: Basic surgical techniques, handling of instruments, incision, dissection, haemostasis, suture.

Unit 5 External trauma.

Unit 6: Patient response to trauma. Tissue repair.

Unit 7: Patient response to trauma. Minimization of surgical stress.

Unit 8.- Basic principles of skin surgery

Unit 9: Reconstructive surgery.

Unit 10: Cures and drains.

Unit 11: Preoperative evaluation of the patient. Anaesthetic risk

Unit 12: Premedication. Induction. Anaesthetic maintenance

Unit 13: Intraoperative monitoring

Unit 14: Complications of the anaesthetic act

Unit 15: Analgesia

Unit 16: Indications and access to the abdominal cavity.

Unit 17: Surgical techniques in abdominal organs: hollow and solid organs. Indications.

Unit 18: Surgical sterilization in the male

Unit 19: Surgical sterilization in the female

Unit 20: Abdominal hernias

Unit 21: Access to the thoracic cavity.

Unit 22: Pathology of osteoarticular diseases. Fundamentals of orthopedic surgery and fracture management.

Unit 23: Oncological Surgery.

Unit 24: Minimally invasive surgery.

Unit 25: Odontostomatology

PRACTICAL PROGRAMME

Practical surgical sessions (5 sessions)

Introduction to the surgical environment (2 h) -CIR1

- Preparation of surgical personnel (cap, mask, gown, gloves...).
- Preparation of the patient and the operating field
  - Recognition and handling of basic surgical instruments. How to assemble the instrument table. *Everything ordered and everything by its name*.
  - How to instrument. *Each hand with its hand*.
    - Handling and maintenance of the instruments in the hands. *First I learn to catch it, then I'll prevent it from falling to the ground*.

Basic suture practices in biomodels (4 h) CIR2

- Recognition of very basic surgical material and suture threads
- Handling of basic surgical instruments
- Performing surgical knots (with the hand and with
- instruments) Performing different types of sutures in biomodels.

Basic surgical techniques I (4 h) performed on corpses or abattoir pieces (according to disposition) CIR3

- Previous to intervention. *What should I have done before start?*
  - Preparation of the operating room, staff, patient, etc. *Don't let me forget anything. A protocol is a list of things to do.*
  - Elementary surgical techniques, incision, dissection, excision and suture. *Good healing begins at the incision*.
  - It's not just stitching. *Save money by learning to make the most of the thread. Don't save by using unsuitable materials, save with good technique...*
  - How the helper should help in the suturing process. *Up and down and without invading our terrain*
  - Most important skin plastias. *Let's avoid the folds*.

Basic surgical techniques II (4 h) performed on corpses. - CIR4

- Haemostasis techniques. Peritoneal management.
- Colors and textures of dead tissue vs. living.
- Opening of a hollow viscera. Closure of a hollow viscera.
- Continuous pattern in the closure of hollow viscera.
- Continuous pattern to close the muscles.
- Continuous pattern at the subcutaneous closure.
- Skin suture review. How tight the knot has to be.

Basic osteosynthesis practices in biomodels (3 h) -CIR5

- Recognition of the basic osteosynthesis material
- Placement of an intramedullary pin
- Placement of cerclage wires
- Handling a bilateral external fixator in one plane
- Placement of an osteosynthesis plate with neutralizing effect

Practical anesthesia sessions (5 sessions)

1. 1**. PAE .- Preanesthesia** . (2,5 h) - ANES1.

Preanesthesia evaluation. How to make a good PAE. Performance of 1 or 2 real real clinical evaluations in the hospital practice. Preanesthesia objectives. Guidelines. Dose calculation.

1. **2. Induction and intubation and gas maintenance - Anesthetic machine.** (2 h.) - ANES2.

Inductive drugs. Anaesthetic plans. Intubation: material, technique, complications. Preparation of

the anaesthetic machine. Circuits. Flow calculation. Inhalation Maintenance

1. **3. Monitoring and complications.** (2.5 h.) - ANES3.

Other maintenance. Analgesia plan. Basic and advanced monitoring. Main anaesthetic complications. CPR

1. 4**. Loco-regional anaesthesia** . (3 h.) - ANES4.

General principles of loco-regional anesthesia. Main nerve blocks based on anatomical references.

1. **5. Clinical anaesthesia.** (3 h.) - ANES5

After passing the self-evaluation of the previous practices, the acquired knowledge will be applied in real clinical cases of the Veterinary Hospital.

Course planning and calendar

Calendar of face-to-face sessions and presentation of papers

The key dates and milestones of the course are described in detail, along with those of the rest of the subjects of the third year in the Veterinary Degree, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradoveterinaria/). This link will be updated at the beginning of each academic year.

Teachers are assigned their tutorials according to their teaching schedule. However, for greater effectiveness, it is recommended to get a tutorial appointment by emailing the teacher you wish to contact, briefly stating the reason.

Bibliografía y recursos recomendados

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28421

Universidad Zaragoza

Year : 2018/19

28422 - Diagnostic Imaging

Syllabus Information

Academic Year: 2018/19 **Subject:** 28422 - Diagnostic Imaging

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 3

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The general goal of the course is to make undergraduate student, once passed the course, get the theoretical and practical knowledge of diagnostic imaging techniques useful in the veterinary field, to later be able to use them in the development of their profession.

The general aims of this course are to:

1. Know the nature and properties of ionising radiation and, in particular, X-rays.
2. Become aware of the harmful effects of ionising radiation.
3. Know the forms of protection based on the principles of justification (any exposure to radiation should lead to a benefit in return), optimisation (seeking minimum risk and maximum benefit) and limitation (not exceeding maximum dose levels).
4. Know the diagnostic applications of ionising radiations through knowledge of the equipment used in veterinary medicine and the most usual techniques, fundamental for good radiological protection.
5. Know the radiological positions and projections of the animal in each species and anatomical region.
6. Know the main radiological contrast media and their main application.
7. Know radiological semiology and to establish the bases for the diagnostic interpretation of radiological images.
8. Know the fundamentals of ultrasound and its usefulness in small and large animals.
9. Know the indications, the diagnostic power and the limitations of ultrasound.
10. Manage the appropriate terminology and know how to interpret an ultrasound report.
11. Know the fundamentals of endoscopy, flexible and rigid, indications and their diagnostic and therapeutic usefulness in small and large animals.
12. Know the fundamentals of thermography, indications and diagnostic usefulness in animals and facilities for their breeding.
13. Know the theoretical bases and indications of computed tomography, magnetic resonance and nuclear medicine, as well as new diagnostic imaging techniques and their applications in veterinary sciences

Context and importance of this course in the degree

Diagnostic Imaging represents a basic subject to carry out the integrations by species, necessary to carry out the clinical diagnosis with guarantee, and also to value certain productive aspects and of animal welfare of our cattle species. For this reason, it is located in the third year, before the student approaches the study of integrations by species and practicum.

Recommendations to take this course

In order to take this subject, it is particularly necessary that students have passed the subjects of Basic Sciences, Anatomy and Embryology I and II.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Identify and differentiate the different image media useful in Veterinary Sciences.
2. Use the different means of diagnosis by image in Veterinary, knowing their applications, indications and limitations in the different species and anatomical regions.
3. Use ionising radiation rationally as a means of diagnosis in Veterinary Medicine, to assess its possible risks and to apply the necessary radioprotection measures for its clinical use.
4. Correct management radiological semiology, to correctly interpret radiological and ultrasound anatomy and to be able to Identify pathological patterns in radiology and ultrasound in the different species and regions, and to associate them with the most frequent pathologies.
5. Perform a quality diagnostic radiography, obtaining the most common projections by means of the correct positioning of the animals and to perform a basic ultrasound scan knowing how to locate the main organs.

Learning outcomes

If students complete the course successfully, they should be able to

1. Get to know the technical bases and fundamentals of the image techniques commonly used in the different animal species of veterinary interest.
2. Know the indications of the imaging techniques commonly used in the different animal species of veterinary interest.
3. Know the language and terms used in the different systems of diagnostic imaging.
4. Know the mechanisms of interaction of X-rays with matter and radioprotection measures.
5. Know how to interpret normal patterns in different imaging techniques.
6. Recognize and knows how to diagnose the main types of pathological patterns and lesions observed in the use of different imaging techniques.
7. Perform a quality radiography in a practical manner, using ultrasound equipment and knowing the basics for performing an endoscopy.

Importance of learning goals

Once the course has been passed, the student will be able to use and interpret different techniques that will allow him/her to obtain information to complete the diagnoses, evaluate the patient's condition with a view to making prognoses, follow the response to treatments, and in livestock species to evaluate reproductive and productive aspects.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Assessment activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

1. For the subject assessment the student will have to pass a theoretical exam and a practical one. The theoretical examination assesses whether the student has acquired the knowledge referred to in learning outcomes 1, 2, 3, 4, 5 and 6, and the practical examination assesses results 3, 4 and 7.
2. The theoretical examination will be carried out in writing, and will consist of answering short answer questions or multiple-choice or true/false questions(reasoned); many of the questions will be about images.
3. The practical examination will consist of answering in written form the questions of a practical nature on the clinical use of the different imaging media, always being based on the activities of the practical programme. In order to take this exam, the student must have attended the practical sessions. In cases in which the

student has not attended all the practical sessions, an oral examination of a practical nature will be carried out.

Valuation criteria and requirement levels

In order to pass the examination, whether theoretical or practical, the student must obtain at least 50 % of the total score. Once both exams have been passed, for the overall evaluation of the subject, the score of the practical exam will be 25% of the final grade of the subject, and that of the theoretician 75%. In case of passing one of the exams, theoretical or practical, will be saved between sessions.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process designed for this subject is based on the following:

The learning process consists in a theoretical part and practical part. The theoretical part consists of a total of 42 hours and for its teaching in class, basic and advanced resources will be used, from the most basic and universal support as blackboard and chalk to more advanced resources as multimedia systems and network connection to access to imaging databases.

The practical sessions will be held with a total of 18 hours, and with them the student will practice the most common techniques used in diagnostic imaging veterinary: ultrasound, radiology and endoscopy, focusing mainly on methodological aspects, safety and interpretation of patterns.

Learning tasks

The teaching of this subject will be taught according to the following activities:

- 42 Theoretical classes of 50 minutes.
- 9 Practices in small groups, ranging between 1 and 2 hours.
- 3 Voluntary Seminars, 1 hour.

In addition, there will be e-learning support with Moodle2, in which teachers, voluntarily, may include summaries of their lectures or practical seminars, additional content, web pages, etc.

Syllabus

The program that the student is offered to achieve the expected results includes the following activities

THEORETICAL PROGRAM:

GENERAL MODULE

Unit 1. Fundamentals of Radiology (2 h)

Unit 2. Fundamentals of Ultrasound (2 h)

Unit 3. Other imaging means: CT, MRI, nuclear medicine. Fundamentals and diagnostic applications (2 h)

Unit 4. Basics of endoscopy (1 h)

MODULE SMALL ANIMALS

Unit 5. Thorax 1: Anatomy applied to imaging in thoracic cavity (1 h)

Unit 6. Chest 2: Chest Radiology (4 h)

Unit 7. Thorax 3: Echocardiography (2 h)

Unit 8. Abdomen 1: Radiological anatomy and radiology of the abdomen (4 h)

Unit 9. Abdomen 2: Ultrasonographic anatomy and abdominal ultrasound (4 h)

Unit 10. Anatomy applied to the imaging of the head and neck. Radiology of the head and neck (2 h)

Unit 11. Anatomy applied to column imaging. Radiology of the column (2 h)

Unit 12. Anatomy applied to extremities imaging. Radiology of the limbs (2 h) MODULE HORSES

Unit 13. Diagnostic imaging of the head (1 h)

Unit 14. Diagnostic imaging of the neck and axial region (1 h)

Unit 15. Diagnostic imaging of the chest. Upper respiratory tract, lungs and lower airways. (2 h)

Unit 16. Diagnostic imaging of the abdomen 1: gastrointestinal and urinary tract (1 h)

Unit 17. Diagnostic imaging of the abdomen 1: reproductive system (1 h)

Unit 18. Diagnostic imaging of the limb 1: finger (hoof and pastern) (1 h)

Unit 19. Diagnostic imaging of the limb 2: fetlock joint and cannon (metacarpus and metatarsus) (1 h)

Unit 20. Diagnostic imaging of the limb 3: proximal regions of the forelimb (carpus, forearm, elbow, upper arm, elbow, shoulder) (1 h)

Unit 21. Diagnostic imaging of the limb 4: proximal regions of the hindlimb (hock, gaskin, stifle, thigh, hip) (1 h)

MODULE OTHER SPECIES

Unit 22: Diagnostic Imaging in exotic species (1 h)

Unit 23: Diagnostic Imaging in livestock species (2 h)

PRACTICAL PROGRAM:

PRACTICE 1. General Ultrasound: Ultrasound types, basic technique, artifacts. (2 hours)

PRACTICE 2. General Radiology: Quality Control (detail, contrast), appliances, security. (1 hour 30 min)

PRACTICE 3. Abdominal ultrasound of small animals: protocoled abdominal ultrasound scan, normal patterns. (2 hours) PRACTICE 4. Small Animal Radiology: positioning, handling and exposure parameters. (2 hours)

PRACTICE 5. Echocardiography: Technique, access windows, normal patterns. (1 hour)

PRACTICE 6. Radiology in horses: quality control (detail, contrast), appliances, security, management, positioning. (2 hours 30 min)

PRACTICE 7. Ultrasound horse's techniques, access windows, normal patterns. (2 hours 30 min) PRACTICE 8. Endoscopy basic techniques, management and description of equipment (1 hour) PRACTICE 9. Diagnostic imaging in livestock animals. (2 hours)

3: VOLUNTARY SEMINARS

SEMINAR 1. Echocardiography and augmented reality (1 hour)

SEMINAR 2. Use of CT for surgical planning (1 hour)

SEMINAR 1. Clinical imaging cases in horses (1 hour)

Course planning and calendar

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28422

Universidad Zaragoza

Year : 2018/19

28423 - General Pathological Anatomy

Syllabus Information

Academic Year: 2018/19

Subject: 28423 - General Pathological Anatomy

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 8.0

Year: 3

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The goal of Pathological Anatomy is to study the lesions that occur in the different cells, tissues and organs during the course of the disease.

The course forms part of the Clinical Sciences Module within the specific subjects of the Degree in Veterinary Medicine and is related to the formative process of Cytology and Histology and General Pathology

Context and importance of this course in the degree

The knowledge of the morphological alterations that occur and of the different pathogenic mechanisms that intervene in the diseases, is one of the most relevant blocks of the veterinary pathology. On one hand, it is a question of understanding how different etiological agents act on organic systems inducing changes that can be observed and interpreted. This course will also provide the student with terminology that will complement their training and help them in the correct writing and interpretation of reports. The students are also trained in necropsy, an important diagnostic tool for the veterinarian in his daily activity, which helps to better understand what has been clinically observed in the live animal.

Recommendations to take this course

Basic knowledge of anatomy, biology, chemistry, biochemistry, cellular and molecular biology, cytology and histology.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Recognize the different types of lesions and their association with pathological processes.
- Understand the pathogenesis of general alterations in the structure and function of cells, tissues, organs and systems.
- Perform animal necropsies and recognize macro and microscopic lesions and take samples for histopathological studies.
- Carry out post-mortem veterinary inspection.
- Search and manage information related to veterinary pathological anatomy

Learning outcomes

If students complete the course successfully, they should be able to

- Know and use correctly the basic terminology of General Pathological Anatomy, macro and microscopic.
- Identify and describe the most common types of macro and microscopic lesions in cells, tissues and organs.
- Know the pathogenic mechanisms that are activated in the animal organism when different pathogens act, as well as their evolution and consequences.
- Know and know how to perform the necropsy technique on animals, as well as the correct collection and shipment of samples for anatomopathological diagnosis.
- Know the anatomopathological basis of postmortem veterinary inspection.
- Manage correctly the sources of bibliographic information related to the subject.

Importance of learning outcomes

In Veterinary studies it is necessary to know the morphological alterations provoked in animal organisms by the action of diverse causes both at a microscopic and macroscopic level. The knowledge of this subject is fundamental for the understanding of other disciplines.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

Students must demonstrate that they have achieved the expected learning outcomes by taking a theoretical-practical examination during the official announcements: June and September. Also, a partial examination will be carried out in the middle of the course.

For the June or September exams, the note of the partial exam will be kept for the students who have passed it. The theoretical-practical examinations shall consist of two parts:

- A theoretical exam that will include multiple-choice questions without penalty, true or false, and short answer questions.
- A practical examination consisting of the identification of macro and microscopic lesions projected onto images.

Global assessment test

Pupils who have not attended a minimum of 80% of the face-to-face practical teaching must prove that they have acquired the practical skills corresponding to the teaching not received by means of a specific examination.

Valuation criteria and requirement levels

Out of a maximum of 100 points to be obtained, the value of the tests will be as follows:

- Theoretical exam: 60 points
- Practical injury identification test: 40 points.

Both exams (theoretical and practical) must be passed separately.

To pass the subject it will be necessary:

- Have performed the mandatory practices of necropsy, demonstration of macroscopic lesions and histopathology or have performed the specific practical examination
- Pass 50% of the theoretical and practical tests referred.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least

for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that is designed for this subject is based on:

a) Lectures: The topics tackled in this course will be presented, explained and discussed in 50 minute lectures where ppt presentations will be used for image support.

b) Practical classes: Students enrolled in General Pathology undertake 4 types of compulsory internship:

1. Necropsies. Students should be able to perform systematic and complete opening of the animal carcass.
2. Demonstration of macroscopic lesions from slaughterhouse. Identify and describe the different types of injuries that can be found in livestock species slaughtered at the abattoir.
3. Histopathology. Microscopic changes that support the macroscopic study and contribute to a better understanding of the meaning of the lesions studied.
4. Seminars.

c) Tutorials: Consultations with a teacher to clarify issues related to the subject.

Learning tasks

The learning process that is designed for this subject is based on:

Lectures, Practical classes and Tutorials (see 5.3. Program)

Syllabus

THEORY

Part I - Introduction.

1. Objectives: Guide of the subject
2. General concepts: General Pathology. Antemortem and postmortem lesions

Part II - Adaptation, damage and cell death.

3. Adaptation cell damage and cell death: Cellular adaptation. Causes of damage. Irreversible cell damage. Apoptosis and necrosis.
4. Adaptation cell damage and cell death: Chronic cellular adaptation: Atrophy. Hypertrophy. Hyperplasia. Metaplasia.
5. Pathological Deposits: Disturbances in water exchange and glycogen stores.
6. Pathological Deposits: Lipids.
7. Pathological Deposits: Proteins.
8. Pathological Deposits: Pigments
9. Pathological Deposits: Minerals.

Part III - Circulatory disorders.

10 Active and passive hyperaemia. Oedema

11. Haemorrhage: Types. Consequences. Evolution.
12. Thrombosis and disseminated intravascular coagulation (DIC).
13. Embolism. Types and consequences.
14. Anaemia, ischemia and infarction: Concept. Types. Consequences and evolution.
15. Lymphatic circulation disorders
16. General disorders of blood circulation. Shock.

Part IV - Inflammation and repair.

17. Inflammation: General concepts. Causes. Terminology and classification
18. Acute inflammation.
19. Chemical mediators of inflammation.
20. Morphological patterns of acute inflammation (I): Serous. Fibrinous.
21. Morphological patterns of acute inflammation (II): Mucous. Purulent. Hemorrhagic.
22. Morphological patterns of acute inflammation (III): Mixed forms of inflammation. Evolution of acute inflammation.
23. Chronic inflammation. Morphological patterns of chronic inflammation.
24. Granulomatous and not granulomatous inflammation.
25. Resolution of inflammation: (I) Regeneration. (II) Repair or cicatrization.

Part V - Disturbances development.

26. Aplasia, hypoplasia. Congenital malformations.

Part VI - Neoplasms.

27. Definition and general concepts. Characteristics of benign and malignant tumours.
28. Evolution of neoplasms
29. Stromal tumour and immune response.
30. Effects of tumours in the host.
31. Molecular basis of neoplasms.
32. Cancer Aetiology.
33. Epithelial and glandular tumours.
34. Connective tissue tumours.
35. Lymphohematopoietic, endocrine and nervous tumours.

Part VII - Immunopathology.

36. Immunodeficiency diseases
37. Hypersensitivity diseases
38. Autoimmunity diseases

Part IX - Introduction to systemic pathology.

39. Systemic pathology of the circulatory system
40. Systemic pathology of the respiratory tract
41. Systemic pathology of the digestive tract
42. Systemic pathology of the urinary system
43. Systemic pathology of the nervous system
44. Musculoskeletal systemic pathology

LABORATORY PRACTICAL CLASSES WITH THE FOLLOWING CONTENTS:

1) Necropsies

Students will conduct systematic and complete necropsies of mammals and birds. 10 hours per student is scheduled for this practice activity

* For access to the necropsy room it is essential to wear nitrile or latex gloves, high rubber boots, overalls and goggles. For security reasons access to anyone not suitably equipped it will be prevented.

2) Macroscopic lesions. 4 hours per student is scheduled for carrying out this activity.

3) Histopathology. 8 hours per student is scheduled for carrying out this activity.

4) Seminars. 8 hours per student is scheduled to perform this activity.

Course planning and calendar

http://veterinaria.unizar.es/horarios1.php?COD_TITULACION=6

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28423

Universidad Zaragoza

Year : 2019/2020

28424 - Toxicology

Syllabus Information

Academic Year: 2019/20

Subject: 28424 - Toxicology

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 3

Semester: First semester **Subject Type:** Compulsory

Module: ---

General information

Aims of the course

The general aim of the Toxicology course within the Veterinary Degree is to introduce the student to the knowledge, assessment and treatment of adverse phenomena produced by chemical substances and some physical agents on living beings and, if necessary, apply veterinary knowledge to the resolution of legal and regulatory problems.

The subject has been divided into blocks which are detailed in the program below. These blocks are as follows:

1. **General Toxicology:** The main types of toxics, their toxicokinetics in the organism, the main mechanisms of toxic action, calculation problems in Toxicology, main methods of analysis, and the general treatment of emergency intoxications are studied.
2. **Industrial Toxicology**: The main toxic groups of industrial origin of incidence in Veterinary are studied, such as corrosive substances, alcohols, glycols, and persistent pollutants.
3. **Toxicology of pesticides**: We will treat the pesticides or pesticides of greater incidence in Veterinary, since they are the causative agents of the most frequent poisonings.
4. **Food Toxicology**: This part corresponds to food-borne intoxications affecting animals, with special attention to mycotoxins.
5. **Plant Toxicology**: Due to the enormous number of toxic plant species, in this section we limit ourselves to the study of those that today produce the greatest number of poisonings, although a brief review is made of the plants of greatest historical importance.
6. **Drugs**: In recent years there has been a considerable increase in the number of incidences in small animals that, sometimes due to the negligence of their owners, have access to drugs and psychoactive substances
7. **Toxicology of metals**: Heavy metals and metalloids with significant incidence in Veterinary are studied.
8. **Toxinology**: We will study the most important poisonous animal species in Europe and the clinical pictures they produce and their treatments.

Context and importance of this course in the degree

Toxicology is a constantly evolving discipline that today encompasses, among others, the study, diagnosis and treatment of the effects of xenobiotics on living beings, the molecular and cellular study of the mechanisms of and the study of the effects of toxic substances on wild flora and fauna. It also participates in the identification and quantification of risks resulting from occupational exposure, and public health aspects with respect to the presence of toxic agents in air, water and the environment in general, as well as in food and medicines.

For all these reasons, Veterinary Toxicology is a fundamental subject in the training of future veterinary professionals, having relevance in all branches of the profession. Its situation within the degree allows students to have already acquired basic previous knowledge, such as the biochemical processes that occur in the cells and the physiological

processes in the different animal species, that will favor an adequate understanding of the contents. On the other hand, the knowledge imparted simultaneously in the other subjects of the same four-month period will contribute to a better integration of the subjects treated in the Toxicology subject. Due to the fact that in the third year of the Veterinary degree the student lacks most of the clinical knowledge necessary for an integral understanding of the different clinical pictures produced by intoxications, the teaching staff takes special care so that the student acquires the fundamental clinical and therapeutic knowledge, which can be assimilated with greater extension in the following courses.

Recommendations to take this course

It is essential to have basic knowledge of Chemistry, Biochemistry and Physiology, taught in the corresponding previous subjects.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Identify and study natural and synthetic toxics
- Apply theoretical knowledge to the resolution of problems of a toxicological nature that may arise during their professional activity.
- Recognize and diagnose different types of symptoms and injuries and associate them with different toxic agents
- Implement the necessary actions to prevent intoxication in animals
- Recognize chemical substances that contaminate and adulterate food, having an impact on Public Health.
- Recognize physical agents that may cause adverse effects to Public and Animal Health.
- Carry out oral and written communication correctly.
- Work as a group and distribute tasks equitably and efficiently

Learning outcomes

If students complete the course successfully, they should be able to:

1. Know the etiology of the poisonings that most frequently affect domestic animals and their predisposing factors.
2. Know the mechanisms of exposure, incorporation, transformation and excretion of toxic substances.
3. Understand the mechanisms of action, symptoms and injuries of the toxic substances of interest in Veterinary Medicine.
4. Know the diagnostic procedure and treatment of poisonings, as well as the measures to implement to prevent them.
5. Comprehend the practical activities proposed.
6. Integrate the concepts of the subject in the resolution of practical cases.
7. Write and present properly a written work that relates the different aspects dealt with in the subject.

Importance of learning goals

The learning results obtained in the subject of Toxicology will favor students directly in the performance of their profession, either in the clinic, in industry or in the Public Administration, through training for the resolution of clinical cases and for the analysis and maintenance of optimal conditions of human and animal health. In all these tasks, Toxicology is a fundamental part, not only in the prevention and treatment of acute or emergency poisonings, but also in chronic ones, avoiding the appearance of degenerative phenomena thanks to the establishment of innocuous exposure values to potential toxics.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Learning outcomes 1 to 4 will be assessed by means of a global test structured as follows:

1 – Global written assessment of the lectures and practical sessions (learning outcomes from 1 to 5). This test will consist of conceptual multiple choice questions (60-90%) and open-ended short answer questions (10-40%). It will account for 90% of the student's final grade in the subject.

2- Learning outcomes 6 and 7 will be assessed by means of a written work (portfolio), which will be carried out throughout the course, and which will contain extended reports of the practical activities. The work will be 10% of the final grade.

The final structure of the written examination of theoretical and practical teaching will be communicated to students well in advance.

The evaluation tests will only be those officially announced.

3- In order to pass the course, it will be necessary to obtain between the global test and the written work, 50% of the maximum grade, after applying the percentages indicated.

Valuation criteria and requirement levels

The evaluation will be 100 % objective, according to the grades obtained between the written tests corresponding to the theoretical and practical teaching. In general, True-False questions add or subtract points whether the answer is right or wrong, respectively, and in the same amount. Short-answer questions and problems do not deduct points from the total.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives.

1 - Participatory Lectures

2 - Practical sessions.

Students will carry out experiments at Toxicology lab. A detailed protocol and all necessary reagents as well as the biosecurity measures to be followed, will be provided to students.

3- Case studies in Toxicology.

A repository of the lecture notes used in class, the course syllabus, practical sessions handouts, as well as other course-specific learning materials will be available via Moodle platform ADD (Universidad de Zaragoza)

Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (3 ECTS): 30 hours.
- Practical sessions (3 ECTS)
    - Laboratory sessions (1.2 ECTS): 12 hours.
    - Problem-solving case studies (1.8 ECTS): 18 hours.

Syllabus

Lectures

I. General Toxicology

1. Introduction
2. Experimental Toxicology
3. Toxicokinetics
4. Biotransformation
5. Toxicodynamics
6. Mutagenesis- Carcinogenesis -Teratogenesis
7. Endocrine disruption
8. Analytical Toxicology
9. Risk assessment
10. Treatment of poisoning

II. Industrial Toxicants

1. Corrosive substances
2. Alcohols and glycols

III. Pesticides

1. Introduction
2. Insecticides
3. Acaricides
4. Rodenticides
5. Avicides
6. Molluscicides

IV. Feed and water Contaminants:

1. Urea
2. Water deficiency
3. Teobromine
4. Mycotoxins

V. Poisonous Plants:

1. Hepatotoxic plants
2. Lectines
3. Cyanogenic plants
4. Oxalates-containing plants
5. Nitrate and nitrite accumulating plants

Practical sessions Place: Toxicology Lab

Session 1: *In vitro Toxicity*, cell culture. 3h.

Session 2: Poisonous and Venomous animals identification. 4h

Session 3: Neurotoxicants: AChE inhibitors. 3h.

Session 4: Methemoglobinemia. Nitrite measurement. 3h.

Case Studies

Session 1: Calculations in Toxicology problems.3h

Session 2: Case studies in Toxicology (Metals) 3h

Session 3: Case studies in Toxicology (Pesticides: Herbicides- fungicides) 3h

Session 4: Case studies in Toxicology (Persistent Contaminants and Petroleum) 3h

Session 5: Case studies in Toxicology (Poisonous Plants and Drugs of abuse) 3h

Session 6: Case studies in Toxicology (Mycotoxins) 3h

Course planning and calendar

Available at the following website (https://veterinaria.unizar.es/) updated every academic year

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28424

Universidad Zaragoza

Year : 2018/19

28425 General Pathology and Propaedeutics I

Syllabus Information

Academic Year: 2018/19

Subject: 28425 - General Pathology and Propaedeutics I

Faculty / School: 105 – Faculty of Veterinary

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 3

Semester: First

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The general goal of this course will be the learning of Nosology, the functional alterations of the organs and systems of the animal organism, the exploration of domestic animals and their clinical assessment, with a view to their subsequent application to the study of animal medicine and production.

The general aims of this course are to:

- Achieve this general objective, the specific learning objectives of the subject of General Pathology and Propedeutics I will focus on achieving that the student is capable of:
- Understand the concept of disease, its characteristics and basic laws.
- Know how to properly use the terminology of General and Propaedeutic Pathology.
- Understand and describing the mechanisms that lead to the alteration of the functioning of animal systems, apparatuses and organs, with the causes that produce them and the biopathological alterations that they generate, especially in the species of greatest interest in veterinary medicine.
- Know and evaluate the mechanisms of adaptation and defense of the organism against the disease and the consequences of the failure of these mechanisms.
- Know and evaluate in a practical way the analytical parameters as a diagnostic-prognostic method.
- Know and be able to perform the techniques of collecting and preserving samples for the most frequent diagnostic tests.
- Manage the basic scientific instrumentation, as well as to acquire the necessary skills for the accomplishment of the main clinical diagnostic tests.
- Know and elaborating the anamnesis and to realize and to interpret a clinical history.
- Know and applying the handling and containment maneuvers of the main domestic animals according to their species and state.
- Know and applying the appropriate exploration maneuvers for each animal species and interpret the results of that exploration.
- Manage the fundamental bibliographic sources for this subject

Context and importance of this course in the degree

The subject of General Pathology and Propaedeutics I of the first four-month period of the third year, complementary to General Pathology and Propaedeutics II, requires the training provided by basic subjects such as Embryology and

Anatomy I and II, Biology and Biochemistry, Cytology and Histology or Physiology, is closely linked to subjects of the same course such as General Pathology, Diagnosis by Image, Pharmacology and Pharmacotherapy or Reproduction and Obstetrics, and should serve for students to acquire the skills necessary to address the rest of the subjects of the degree, especially those of a more clinical nature such as integrations in pets, equids and ruminants

Recommendations to take this course

It is convenient that students have taken all the subjects of the previous courses and to be enrolled in the failed subjects.

In order to take this course it is particularly necessary that the student has a solid knowledge of anatomy, histology and animal physiology, which allows him to assimilate the changes that pathology induces in the organism.

Special importance is given to the practical part of the subject, so it is recommended participation and involvement in the practical activities of this subject.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Interpret the pathological processes that act on the animal organism.
2. Apply theoretical knowledge to the analysis of practical situations, problem solving and decision making in real contexts.
3. Handle properly domestic animals during exploration.
4. Critically reason and develop capacities for analysis, synthesis and evaluation. 5: Communicate correctly and effectively, using appropriate scientific terminology. 6: Organize, plan your work and manage information.
5. Be integrated in a work team to achieve common objectives, distributing and sharing responsibilities.

Learning outcomes

If students complete the course successfully, they should be able to

1. Know and understand the fundamentals of nosology as an abstract study of disease.
2. Correct use the medical terminology specific to this subject.
3. Know and understand the pathogenic mechanisms that lead to the functional failure of an organ, system or apparatus, and the disturbances that occur in the organism and that give rise to the symptoms and syndromes clinical diseases resulting from these alterations.
4. Take biological samples and choosing the basic and complementary laboratory techniques that allow their evaluation, as well as interpreting the result of the same in order to detect the corresponding biopathological alterations.
5. Know and apply correctly the methods and procedures of clinical examination of the different organs and appliances in domestic animals and is able to interpret the results derived from such examination.
6. Prepare and/or interpret a clinical history in the main species of domestic animals

Importance of learning outcomes

Knowledge of physiopathology and the practical application of clinical examination on the animal are necessary both for the maintenance of health and for the diagnosis, prognosis and treatment of diseases affecting animals.

This knowledge constitutes the fundamental base on which the clinical training of the veterinarian is based, being more useful and necessary to the extent that this learning is more oriented towards a practical clinical activity.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he or she has achieved the intended learning outcomes through the following assessment activities

Assessment of learning outcomes

Exploration practices (1 to 4) will evaluate skills in handling and exploring animals of different species. For this

purpose, a practical test will be carried out at the end of each session.

Each of the practical exercises will be assessed with a maximum of 6 points. The maximum possible score will be 24 points. In order to pass this group of practices, a score equal to or greater than 15 points must be obtained in this section.

Remaining practices (5 to 8) will evaluate the student's attitude and participation in the activity, as well as the results of the report that must be completed and delivered at the end of each of the practical sessions.

Each of the practical sessions will be evaluated with a maximum of 3 points. The maximum possible score will be 12 points. In order to overcome this group of practices, a score equal to or greater than 7 points must be obtained in this section.

Students who do not exceed the minimum score required in blocks 1.a and 1.b during the development of the practices, either for lack of attendance or for obtaining very low marks in the examination tests or in the laboratory reports, will be summoned to a practical examination of the corresponding block/s in each of the official summons.

At the **end of the school year**, a written test will be taken consisting of 32 short answer questions corresponding to the content of the theoretical classes and seminars given. Each question will have a maximum score of 2 points. In order to pass the written test, a score of 35 points or more must be obtained.

In order to pass the course it is required to pass separately each of the 3 previous sections and the grades obtained in sections 1.a and 1.b will only be added with the grade obtained in the written test, when the latter has reached a minimum of 35 points.

If the student has passed the written test and has not passed activities 1a and/or 1b, the grade obtained in the first one will be maintained until the next call within the same academic year. In the opposite case, once the activities 1a and/or 1b of practices have been passed, the qualification obtained will be maintained for future sessions.

Global assessment test:

Those students who are not part of the face-to-face programme and participate in all the proposed activities must undergo a global evaluation test, which includes three sections:

Written test, consisting of 32 short questions corresponding to the content of the theoretical classes and seminars given. Each question will have a maximum score of 2 points. In order to pass the written test, a score of 35 points or more must be obtained.

Practical test, with two parts:

- Exploration: One or more exploration exercises will be carried out on one or more animal species. The screening test shall have a maximum score of 24 points. In order to pass this test, a score of 15 points or more must be obtained.
- Laboratory: carrying out one or more practical exercises related to the practices developed in the laboratory. The evaluation of laboratory practice shall have a maximum score of 12 points and a score equal to or greater than 7 points shall be obtained to pass this part.

To pass the subject requires passing separately each of the previous sections and the grades obtained in the two parts of the practical test (examination and laboratory) will only be added with the note of the written examination in cases where the written test has been passed with a minimum of 35 points.

If the student has passed the written test and not the practical examination and/or laboratory test, the grade obtained in the first one will be maintained until the next session within the same academic year. In the opposite case, once passed the practical test of exploration and the practical exercise of laboratory, the qualification obtained will be maintained for the future calls.

In order to pass this subject, a total score of 57 points or more out of a possible 100 points must be achieved and each of the 3 sections evaluated (written test, exploration practice, laboratory practice) must pass independently.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.
0-4,9: FAIL.
5,0-6,9: PASS
7,0-8,9: GOOD (NT).
9,0-10: EXCELLENT (SB).
As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

Learning tasks

Theoretical classes: 30 hours of theoretical classes will be given, including a first class of introduction and presentation of the subject. Throughout the course, the teacher makes available to the students the scripts, materials and/or bibliographical references that he considers appropriate in each case. It is interesting that in the development of these classes students have in mind the knowledge acquired in other subjects of the degree, which will allow them a better understanding of the subject and facilitate the assimilation of new content explained in each subject, while allowing the student to develop their capacity for analysis, synthesis and relationship of concepts.

Practical classes: Prior to each of the practical sessions, students will have the necessary scripts and materials, as well as an explanation of what will be done in each of them. This information must be consulted and analyzed by the student, so that when he reaches the corresponding practice, he makes the most of the time available to carry out the practical activity. The session will begin with an explanation of the work to be done and then the students will carry out the practice with the available animals or in the laboratory, always under the supervision of the teacher.

Case study sessions and case studies: These are sessions in which the students should be the main ones and actively intervene. Prior to each session, all the material to be worked on will be made available to the students so that they can analyse it and answer the questions posed in each case. The seminar session will be a sharing and discussion guided by the teacher, in which the proposals put forward by the group will be evaluated and any doubts that may arise throughout the session will be resolved.

Syllabus

PROGRAM OF THEORETICAL CLASSES

This program consists of 30 hours of participatory master class, distributed in 30 sessions of 1 hour.

MODULE I: General and physiopathology of the skin

Topic 1 -- Introduction and presentation of the subject.

Topic 2 - Nosology: concepts of Pathology and Clinical. Description of the disease.

Topic 3 - Exploration methods and clinical history.

Topic 4 - Physiopathology of thermoregulation: hypothermia, hyperthermia and febrile syndrome.

Topic 5 - Exploration of the layer, skin and lymphatic system I.

Topic 6 - Exploration of the layer, skin and lymphatic system II.

Topic 7 -- Physiopathology of the skin: itching, alterations of the hair follicle and annexes.

MODULE II: Physiopathology of the blood and circulatory system

Theme 8 - Physiopathology of the erythroid series. Erythrocytosis: definition and classification.

Theme 9 - Physiopathology of the erythroid series. Anemias: definition and classification. Regenerative anemias.

Topic 10 - Physiopathology of the erythroid series. Non-regenerative anemias.

Topic 11 -- Physiopathology of the leukocyte series. Definition and classification of leukocytosis and leukopenia.

Topic 12 - Physiopathology of haemostasis. Primary haemostasis alterations: vascular and platelet alterations.

Topic 13 - Physiopathology of haemostasis. Alterations in secondary haemostasis: alterations in blood coagulation. Mixed disorders: disseminated intravascular coagulation syndrome.

Topic 14 - Congestive heart failure. Clinical manifestations of congestive heart failure. Diseases that lead to congestive heart failure.

Topic 15 - Cardiac arrhythmias I.

Topic 16 - Cardiac arrhythmias II.

Topic 17 - Circulatory shock.

MODULE III: Physiopathology of the respiratory system.

Topic 18 - Defensive mechanisms of the respiratory system and exploration of the extrathoracic pathways, sinuses and guttural bags. Coughing and sneezing.

Topic 19 - Disturbances in respiratory mechanics. Alterations in the frequency, depth and rhythm of respiratory movements. Dyspnea.

Topic 20 - Respiratory failure syndrome and its consequences I.

Topic 21 - Respiratory failure syndrome and its consequences II.

Topic 22 - Physiopathology of pulmonary circulation. Pulmonary hypertension and pulmonary edema.

Topic 23 - Pulmonary syndromes: Emphysema, atelectasis and pulmonary fibrosis.

Topic 24 - Physiopathology of the pleura and mediastinum.

Topic 25 - Respiratory chest exploration.

MODULE IV: Physiopathology of metabolism and nutrition

Topic 26 - Physiopathology of hydro-electrolytic equilibrium: Disorders of water balance: global dehydration and global hyperhydration. Alterations in the metabolism of sodium, chlorine and potassium.

Topic 27 - Physiopathology of acid-base balance: respiratory acidosis and respiratory alkalosis. Metabolic acidosis and metabolic alkalosis.

Topic 28 - Physiopathology and biopathology of nutrition: Immediate principles. Protein metabolism disorders: Hypoproteinemias and hyperproteinemias. Disorders of carbohydrate metabolism: hypoglycaemia and hyperglycaemia.

Topic 29 - Physiopathology and biopathology of nutrition: minerals. Pathological variations of calcium, phosphorus and magnesium. Osteodystrophies.

Theme 30 - Physiopathology and biopathology of nutrition: energetic imbalances. Obesity and slimming syndromes.

PROGRAM OF PRACTICAL CLASSES

It consists of 30 hours of practical activities, distributed in 8 sessions of 3 hours of work with animals and/or laboratory, and 4 sessions of 1 to 2 hours of clinical cases or practical assumptions.

1. Exploration in the dog (3 h): Behaviour and handling. Taking constants, mucous membranes, lymphatics... Respiratory system.
2. Exploration in equids (3 h): Behaviour and handling. Taking constants, mucous membranes, lymphatics... Respiratory system.
3. Exploration in sheep (3 h): Behaviour and handling. Taking of constants, lymphatics. Respiratory system.
4. Cattle exploration (3 h): Behavior and management. Taking of constants, mucous membranes, lymphatics... Respiratory system.
5. Application of substances in domestic animals (3 h).
6. The skin: taking samples and basic diagnostic tests. (3 h)
7. Haematology (3 h): Sampling. Basic laboratory analysis.
8. Cardiac exploration: electrocardiography and blood pressure. (3 h)

A- Clinical cases and practical cases: Anamnesis (1'5 h).

B- Clinical cases and practical cases: Hematology (2 h).

C- Evaluation of the corporal condition in the dog and cat and its influence on the quality of life (1 h).

D- Management and exploration in pigs (1'5 h).

The detailed programme of theoretical and practical activities is complemented by:

- Study for the consolidation of knowledge and preparation of written and practical tests and clinical case resolution
- Tutoring.

- Carrying out of the above tests

Course planning and calendar

The dates and key milestones of the course are described in detail, along with those of the other subjects of the Veterinary Degree, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradoveterinaria/). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28425

Universidad Zaragoza

Year : 2018/19

28426 - General Pathology and Propaedeutics II

Syllabus Information

Academic Year: 2018/19

Subject: 28426 - General Pathology and Propaedeutics II

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 3

Semester: Second semester

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The general objective of this course will be the learning of the functional alterations of the organs and systems of the animal organism, the clinical examination of domestic animals and their l evaluation, with a view to their subsequent application to the study of animal medicine and production.

To achieve this general objective, the specific learning objectives of the subject of General Pathology and Propaedeutics II will focus on achieving that the student is able to:

- Know how to properly use the terminology of General and Propaedeutic Pathology.
- Know, understand and describe the mechanisms that lead to the alteration of the functioning of animal systems, apparatuses and organs, with the causes that produce them and the biopathological alterations that they generate, especially in the species of greatest interest in veterinary medicine.
- Know and evaluate the mechanisms of adaptation and defense of the organism against the disease and the consequences of the failure of these mechanisms.
- Know and evaluatie in a practical way the analytical parameters as a diagnostic-prognostic method.
- Know and be able to perform the techniques of collecting and preserving samples for the most frequent diagnostic tests.
- Manage the basic scientific instrumentation, as well as to acquire the necessary skills for the accomplishment of the main clinical diagnostic tests.
- Know and elaborate the anamnesis and make and interpret a clinical history.
- Know and apply the appropriate clinical examination maneuvers for each animal species and interpret the results.
- Know and carry out the basic techniques for therapy application in domestic animals.
- know and manage the fundamental bibliographic sources for this subject.

Context and importance of this course in the degree

The subject of General Pathology and Propaedeutics II in the second four-month period of the third course requires the training provided by General Pathology and Propaedeutics I, and the basic subjects of Embryology and Anatomy I and II, Biology and Biochemistry, Cytology and Histology or Physiology. General Pathology and Propaedeutics II is also closely linked to subjects of the same course such as General Pathology, Diagnosis by Image, Pharmacology and Pharmacotherapy or Reproduction and Obstetrics, and should serve for students to acquire the skills necessary to address the rest of the subjects of the degree, especially those of a more clinical nature such as integrations in pets, equids and ruminants.

Recommendations to take this course

It is convenient for students to be enrolled/have passed General Pathology and Propedeutics I. It is also convenient for students either to have passed all the subjects of the previous courses or to be enrolled in failed subjects.

In order to take this course it is particularly necessary for the student to have a solid knowledge of anatomy, histology and animal physiology, which allows him to assimilate the changes that pathology induces in the organism.

Special importance is given to the practical part of the subject, so it is also recommended the participation and involvement of the students in the practical activities of this subject.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Interpret the pathological processes t acting on the animal organism.
2. Apply theoretical knowledge to the analysis of practical situations, solving problems and making decisions in real contexts.
3. Properly handle domestic animals during clinical examination.
4. Critically reason and develop capacities for analysis, synthesis and evaluation. 5: Communicate correctly and effectively, using appropriate scientific terminology.
5. Organize and plan the work and manage information.
6. Integrate in a work team to achieve common objectives, distributing and sharing responsibilities.

Learning outcomes

If students complete the course successfully, they should be able to

1. Use correctly the medical terminology specific to this subject.
2. Know and understand the pathogenic mechanisms that lead to the functional failure of an organ, system or apparatus, and the disturbances that occur in the organism and give rise to the clinical symptoms and syndromes of the diseases resulting from these alterations.
3. Take biological samples and choose the basic and complementary laboratory techniques that allow their evaluation, as well as interpret the results in order to detect the corresponding biopathological alterations.
4. Know and apply correctly methods and procedures for clinical examination of the different organs and systems in domestic animals and interpret the results derived from such examination.
5. Prepare and/or interpret a clinical history in the main species of domestic animals.

Importance of learning outcomes

Knowledge of physiopathology and the practical application of clinical examination on the animal are necessary both for the maintenance of health and for the diagnosis, prognosis and treatment of diseases affecting animals.

This knowledge constitutes the fundamental base on which the clinical training of the veterinarian is based, being more useful and necessary to the extent that this learning is more oriented towards a practical clinical activity.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

Assessment of learning outcomes

Clinical examination practices (1, 2, 4, 6, 7, 9, 10 and 11) will assess skills for handling and clinical examination of animals of different species. A practical test will be carried out at the end of sessions 9, 10 and 11. Each of the practical exercises will be assessed with a maximum of 8 points. The maximum possible total score in this section will be 24 points. In order to pass this group of practices, a score equal to or greater than 15 points must be obtained in this section.

The remaining practices (3, 5 and 8) will assess the student's attitude and their participation in the activity, as well as the results of the report that must be completed and delivered at the end of each of the practical sessions.

Each of these sessions will be assessed with a maximum of 4 points. The maximum possible total score in this section will be 12 points. In order to overcome this group of practices, a score equal to or greater than 7 points must be obtained in this section.

Students who do not exceed the minimum score required in blocks 1.a and 1.b, during the development of the practices, either for a lack of attendance or for obtaining an insufficient score, will be summoned to a practical test of the corresponding block/s in each of the official summons.

At the end of the school year, a written test will be conducted consisting of 32 short answer questions corresponding to the contents of the theoretical classes and seminars. Each question will have a maximum score of 2 points. In order to pass the written test, a score of 35 points or more must be obtained.

In order to pass the course, it is necessary to pass separately each of the 3 previous sections and the grades obtained in sections 1.a and 1.b will only be added to the grade obtained in the written test if the latter one has reached a minimum of 35 points.

If the student has passed the written test and has not passed activities 1.a and 1.b, the grade obtained in the first one is maintained until the next call within the same academic year. In the opposite case, once the activities 1.a and 1.b have been passed (and the written test has not been passed), the grades will be maintained for future calls.

Global assessment test

Those students who are not part of the face-to-face program and do not participate in all the proposed activities must undergo a global evaluation test, which includes three sections:

Written test, consisting of 32 short answer questions corresponding to the contents of the theoretical classes and seminars. Each question will have a maximum score of 2 points. In order to pass this written test, a score of 35 points or more must be obtained.

Practical test, two parts:

1. Clinical examination: one or more clinical examination exercises will be carried out on one or more animal species. The screening test shall have a maximum score of 24 points. In order to pass this test, a score of 15 points or more must be obtained.
2. -Laboratory: t one or more practical exercises related to the practices developed in the laboratory will be conducted. The evaluation of laboratory practice shall have a maximum score of 12 points and a score equal to or greater than 7 points shall be obtained to pass this part.

To pass the subject is required to pass separately each of the previous sections and the grades obtained in the two parts of the practical test (clinical examination and laboratory) will only be added with the score of the written examination in case the written test has been passed, with a minimum of 35 points.

If the student has passed the written test and has not passed the practical examination and/or laboratory test, the qualification obtained in the first one will be maintained until the next call within the same academic year. Otherwise, once the clinical examination test and the practical laboratory test have been passed, the qualification obtained will be maintained for future calls.

Valuation criteria and requirement levels

In order to pass this subject, a total score of 57 points or more out of a possible 100 points must be achieved and each of the 3 sections evaluated (written test, clinical examination practice, laboratory practice) must be passed independently.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree:

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that has been designed for this course is based on the following:

Lectures, practical lessons, works, case presentations...

-Lectures: 30 master type lectures of 50 minutes' duration each will be given. They will be taught in the classroom that the Center determines, with students divided into two groups.

-Practical lessons: a total of 22 hours of practical lessons will be given in the classroom demonstrations of the building of the Clinical Veterinary Hospital, in the teaching ship of the Experimentation Animal Service and in the General Pathology teaching laboratory.

-Clinical cases sessions are taught in the General Pathology teaching laboratory, in the library of the General Pathology Unit or in a classroom, and include a total of 8 hours spread over several sessions.

Learning tasks

-Lectures: 30 hours of lectures will be given, including a first class of introduction and presentation of the subject. Throughout the course, the teacher offers students scripts, materials and/or bibliography appropriate in each case. It is interesting that in the development of these classes students have present the knowledge acquired in other subjects of the degree, which allowed a better understanding of the matter and will facilitate the assimilation of new content explained in each subject, allowing at the same time that the student develop its capacity for concepts analysis, synthesis and relationship.

-Practical lessons: prior to each of the practical sessions, the students will have scripts and materials needed for them, as well as the explanation of what it is to be performed in each one. This information must be consulted and analyzed by the student, so that when they arrive at the corresponding practice they make the most of the available time to perform practical activity. The session will begin with an explanation of the work to be carried out and subsequently the students run practice with available animals or in the laboratory, always under the supervision of the teacher.

- Clinical case sessions: they are sessions in which students must be the main protagonists and intervene actively. Prior to each session, all materials that is going to work with will be available to students, so that they can analyze and respond to the questions raised in each case. Seminar session will be a sharing and discussion session guided by the teacher, in which the proposals raised by the group will be assessed, and questions can be solved.

Syllabus

1: LECTURES PROGRAM

This program consists of 30 participatory master classes, distributed in 30 sessions of 1 hour.

MODULE I: Pathophysiology and biopathology of the digestive tract.

Lesson 1 - Pathophysiology and examination of the mouth, pharynx and salivary glands.

Lesson 2 - Pathophysiology of the esophagus and the stomach: dysphagias and regurgitation.

Lesson 3 - Vomiting syndrome (I).

Lesson 4 - Vomiting syndrome (II).

Lesson 5 - Pathophysiology of the bowel: Bowel ileus. Constipation. Diarrhea syndrome. Malabsorption syndrome.

Lesson 6 - Pathophysiology, biopathology and examination of the liver and biliary tract: Alterations of the bile, vascular, metabolic and detoxifier functions. Serum enzymes and

functional tests.

Lesson 7 - Pathophysiology, biopathology and examination of the exocrine pancreas: Acute Pancreatitis. Exocrine pancreatic insufficiency.

Lesson 8 - Pathophysiology, biopathology and examination of the stomach of ruminants. Indigestions (I).

Lesson 9 - Pathophysiology, biopathology and examination of the stomach of ruminants. Indigestions (II).

Lesson 10 - Pathophysiology, biopathology and examination of the stomach of ruminants. Indigestions (III)

MODULE II: Pathophysiology, biopathology and examination of urogenital tract

Lesson 12 - Pathophysiology of diuresis: Syndrome polyuria/polydipsia. Oliguria, anuria, and urinary incontinence.

Lesson 13 - Kidney failure: Etiology and pathogenesis.

Lesson 14 - Glomerulopathies.

Lesson 15 - Tubular syndromes and interstitial nephropathy.

Lesson 16 - Examination and biopathology of urinary system.

Lesson 17 - Examination of the male genital apparatus.

Lesson 18 - Examination of the female genital apparatus.

Lesson 19 - Examination of the breast.

MODULE III: Pathophysiology and examination of the endocrine system and the nervous system.

Lesson 20 - Pathophysiology, biopathology and examination of the hypothalamic-pituitary axis: Alterations in the secretion of somatotropin and antidiuretic hormone.

Lesson 21 - Pathophysiology, biopathology and examination of adrenal glands: Hyper and hipoadrenocorticism.

Lesson 22 - Pathophysiology, biopathology and examination of thyroid and parathyroid glands: Hyper and hypofunction.

Lesson 23 - Pathophysiology, biopathology and examination of the endocrine pancreas: Hyper and hipoinsulinism.

Lesson 24 - Pathophysiology and biopathology of the adaptation and the pain.

Lesson 25 - Examination of the nervous system: Identification of neurological signs and location of the lesion.

Lesson 26 - Pathophysiology of the brain: Pathogenesis of processes that affect the brain.

Lesson 27 - Pathophysiology of spinal cord: Pathogenesis of processes that affect the spinal cord.

Lesson 28 - Examination of the musculoskeletal system.

Lesson 29 Clinical examination of the eye.

Lesson 30 Clinical examination of the ear.

2: PROGRAM OF PRACTICAL LESSONS

This program consists of 30 hours of practical activities, distributed in 11 sessions of 1'5-3 hours working with animals or in the laboratory, and 4 sessions of 2 hours of clinical cases.

1. Clinical examination of the abdomen in the dog (1'5 h).
2. Clinical examination of the abdomen and nervous system in the horse (1'5 h).
3. Clinical examination of the digestive system of ruminants and analysis of rumen fluid (3 h).
4. Clinical examination of the genitourinary system and breast in ruminants and biological sampling (2 h).
5. Sampling and basic analysis of urine (2 h).
6. Clinical examination of the nervous and muscle-skeletal systems in the dog (2 h).

7. Clinical examination of the senses in the dog (2 h).

8. Assessment of farms and communities (2 h).

9. Applied clinical examination in the horse (2 h).

10. Applied clinical examination in the dog (2 h).

11. 11 Applied clinical examination in ruminants (2 h).

A.- Clinical cases: Digestive biopathology (2 h).

B.- Clinical cases: Renal biopathology (2 h).

C.- Clinical cases: Endocrine biopathology (2 h).

D.- Clinical cases: Biopathology in large animals (2 h).

The detailed program of theoretical and practical activities must be supplemented by:

-Personal work for the consolidation of knowledge and preparation of the written and practical exams and the resolution of clinical cases.

-Tutorials

-Exams

Course planning and calendar

Calendar of sessions and delivery of tasks

Dates and key milestones of the subject are described in detail, together with those of the rest of the subjects of the third course in the degree of veterinary medicine, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradoveterinaria/). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28426

Universidad Zaragoza

Year : 2018/19

28427 - Deontology, Legal Veterinary Science and Bioethics

Syllabus Information

Academic Year: 2018/19

Subject: 28427 - Deontology, Legal Veterinary Science and Bioethics

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 3

Semester: Second semester

Subject Type: Compulsory

Module: ---

General information Aims of the course

The general goal of this course is to provide a solid background in the ethical principles of the profession and laws and rules that guide the activities of the veterinarian working in any field.

Context and importance of this course in the degree

This is a key course of the Degree in Veterinary Science since it introduces the student into all the ethical and legal aspects of the profession. Nowadays, many veterinarian activities may pose a legal repercussion. Independently of their field of expertise, veterinarians need to be aware of their role in the society, how the profession is organized and represented, and how to find and apply specific legislation.

Recommendations to take this course

It is recommended to have basic knowledge of physiology, general and therapeutic pathology, and notions of infectious and parasitic diseases, epizooties, and hygiene inspection.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Start and develop his professional activity within the specific ethical and legal framework.
- Observe an ethical behavior in his practice, respectful of the profession and the society, as well as enhance his critical thinking skills.
- Produce correct and efficient professional reports, both written and orally.
- Search and manage ethical and legal information related with the veterinary practice.
- Work in groups efficiently, with an equitable distribution of tasks.

Learning outcomes

If students complete the course successfully, they should be able to

1. Know the ethical principles of the veterinary profession.
2. Know the legislative authorities, and the legal regulations of veterinary interest.
3. Understand the basic aspects of legal and forensic medicine, expert assessment and veterinary commercial activities.
4. Understand the practical sessions and ability to analyse a legal veterinary problem.
5. Integrate the concepts seen during the course to solve practical cases.
6. Produce and present correctly a written assay on different aspects of the subject.

Importance of learning outcomes

Thanks to the knowledge of profession-specific action guidelines, and of administrative and legal processes, the learning goals achieved in this course will directly help the students in their professional practice, either on clinic practice, industry, assurance companies, or public administration.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Learning goals 1 to 4 will be assessed by a written exam, structured as follows:

- Theory evaluation part: True/False questions and short answer questions. It will have a weight of 80% in the final mark.
- Practical part: True/False questions and short answer questions. It will have a weight of 10% in the final mark.

Learning goals 5 and 6 will be assessed by an assignment (portfolio), to be developed throughout the course, which will contain reports of the practical sessions, and deontological and expert case studies seen during the course. It will have a weight of 10% in the final mark.

To pass the course, students must have at least 50% of the maximum score.

Methodology, learning tasks, syllabus and resources

The methodology followed in this course is oriented towards achievement of the learning objectives.

1 - Participatory lectures: The professor will present theoretical contents. Students are expected to participate actively in the class.

2 - Practical sessions.

They will comprise the identification of animal species at the Toxicology Laboratory, resolution of practical deontological and expert cases, completion of official forms and documents. Students will also perform a legal necropsy with special emphasis on preparation of samples. Printed handouts containing the activity guide as well as the biosecurity measures to be followed, will be provided to students where necessary.

A repository of the lecture notes used in class, the course syllabus, practical sessions handouts, as well as other course-specific learning materials will be available via Moodle (Universidad de Zaragoza).

Learning tasks

The course includes 6 ECTS organized according to:

Lectures (4.4 ECTS): 44 hours.

Practice sessions (1.6 ECTS): 16 hours.

Syllabus

Lectures

I. Public administrations and organization of the profession

1. Introduction. General Concepts.

2. State and European Union Organization.
3. Legislative structure and official documentation.
4. Veterinary profession organization: Colleges, Associations, Unions.
5. Role of veterinarians in society.
6. Veterinary practice: Administrative requisites.
7. Veterinary practice: Special requisites.
8. Occupational diseases.

II. Deontology

1. Concepts in Deontology, Ethics, Bioethics.
2. Deontological codes, veterinary ethics, vices.
3. Euthanasia.
4. Professional responsibility: I. Penal responsibility.
5. Professional responsibility: II. Civil and administrative responsibility.

III. Legal and forensic Veterinary

1. Structure of Judiciary.
2. Judicial proceeding and its components.
3. Practice as an Expert: types and legislation.
4. Expert's report, evidence sampling and chain of custody.
5. Forensic tanatology.
6. Forensic traumatology.
7. Forensic roles of the veterinarian.
8. Legal necropsy.

IV. Legal Commercial Veterinary

1. Animal trade, types of contracts and vices.
2. Livestock and agrarian insurances.
3. Animal identification.
4. Animal traceability.
5. Standardization, official organs and quality labels.
6. Veterinary role in animal shows.
7. Animal doping.

V. Veterinary legislation

1. Legislation of Animal Health.
2. Legislation of veterinary medicaments.
3. Legislation of genetically modified organisms.
4. Legislation of ecological products.
5. Legislation of animal wellbeing.
6. Legislation of pets' possession.
7. Legislation of environmental contamination.

Practical sessions

Session 1: Identification of animal species from biological remains. Duration: 4 hours. Place: Laboratory of Toxicology. Session 2: Deontological cases. Duration: 3 hours. Place: classroom.

Session 3: Expert's report. Completion of legal documents. Duration: 3 hours. Place: classroom.

Session 4: Legal necropsy. Legal aspects of evidence sampling in Veterinary. Duration: 3 hours. Place: Laboratory of Toxicology.

Session 5: Search of Spanish and European Legislation. Duration: 3 hours. Place: Library of the Toxicology

Unit.

Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course please refer to the Faculty of Veterinary website (https://veterinaria.unizar.es/).

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28427

Universidad Zaragoza

Year : 2018/19

28428 - Reproduction and Obstetrics

Syllabus Information

Academic Year: 2018/19

Subject: 28428 - Reproduction and Obstetrics

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 3

Semester: Second semester

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The general goal to be achieved with the subject focuses on the students to know in depth the aspects, both physiological and pathological and technological, affecting the reproductive organ function pets to apply them in their control, management and resolution problems.

The specific objectives to be achieved to achieve the overall objective are:

- Understand the main concepts, principles and terms in which the subject of Reproduction and Obstetrics and its importance within the veterinary profession is based.
- Remember the anatomical configuration and physiological function of those parts or organ systems of domestic animals, either directly or indirectly involved in the reproductive function in both the female and the male, as well as disorders related to both.
- Know and understand the techniques of biotechnology applicable in the field of animal breeding to improve production and/ or economically, reproductive performance of domestic and useful species.
- Know and understand the reproductive phenomena that are necessary to achieve pregnancy and diagnosis
- Know and understand the reproductive phenomena concurring before, during and after childbirth, and obstetric situations applicability.
- Know and understand the various methods of diagnosis and treatment of various pathological conditions directly related to reproductive function in various domestic species way.
- Establish the basic bibliography of consultation and encourage their use. Besides objective of the course will enhance the development of several generic skills, defendants in the professional field.

Context and importance of this course in the degree

By means of Reproduction and Obstetrics, as a compulsory subject within the module Clinical Sciences in the Department of Animal Medicine and Surgery, students should acquire the necessary skills to be able to attend the fourth grade Reproduction species integrated in the module " Animal Clinical Sciences and Health "and optimize learning and the implementation of the knowledge acquired in the last degree course (" Practicum "). And finally, the application of all this knowledge into their professional work as a veterinarian.

Recommendations to take this course

The student must have completed all the courses of first and second degree course and be enrolled in the subjects which in his case would have been pending in these courses.

It is necessary to have a solid knowledge of anatomy and animal histology, biology and physiology. It is also important the understanding of the endocrine basis applicable to the study of reproductive function.

Competences and learning outcomes

Competences

On successful completion of this course, students will be able to:

Transversal skills

- Analyse, synthesize, solve problems and make decisions in the areas of veterinary professionals.
- Teaming, uni or multidisciplinary and show respect, appreciation and sensitivity to the work of others.
- Maintain ethical behavior in the exercise of their responsibilities to the profession and society.
- Disclose information obtained during the professional practice of veterinary fluently, oral and written, with other colleagues, authorities and society in general.
- Write and present professional reports, while maintaining the necessary confidentiality.
- Search and manage information related to veterinary activity.
- Know and apply the scientific method in professional practice including evidence-based medicine.
- Know advice and professional help
- Be aware of the need to maintain current knowledge, skills and attitudes of professional skills through a process of continuous training.
- Know the rights and duties of the veterinarian, with special emphasis on ethical principles.
- Know the organizational, economic and management aspects in all those fields of the veterinary profession.

Specific skills

- Manage anatomy-physiological concepts reproductive endocrinology both male and female.
- Perform history and clinical examination of the animals from reproductively.
- Collect and forward all types of samples with its report, as support for reproductive clinic.
- Perform basic analytical techniques and interpret their clinical, biological and chemical results in the field of reproduction.
- Apply knowledge of the different biotechnologies of animal reproduction.
- Have the basis for planning, diagnosis, monitoring and maintenance or interruption of pregnancy.
- Assist in childbirth, postpartum and in basic newborn care.
- Identify possible changes that may occur to the reproductive system in both male and female, facing his diagnosis, using various general and instrumental techniques, including necropsy.
- Apply the most common medical and surgical treatments in animal's reproductive clinic level and basic care to ensure the proper reproductive functioning.
- Diagnose and resolve obstetrical problems through surgical techniques doctor.
- Addressing reproductive emergency room and Veterinary first aid

With the objectives reflected in the Grade skills in Veterinary Medicine (Order ECI / 333/2008) for this subject, which are addressed:

- Reproduction, childbirth and postpartum: Care and diseases.
- Assisted Reproduction.
- Methods and procedures for clinical examination, additional diagnostic techniques and interpretation.
- Diagnosis.

Learning outcomes

If students complete the course successfully, they should be able to

- Know, understand and explain the basics of each of the steps involved in the process of reproduction and reproduction biotechnologies and obstetric techniques.
- Interrelate different concepts and knowledge to apply to treatments playback control, facing planning, optimization and resolution of pathology, using techniques and most appropriate treatments.
- Use properly the scientific terminology of this matter.
- Handle basic scientific instrumentation and to obtain data by performing various tests in the laboratory and analyze the data to get results that can interpret and can use.
- Acquire the necessary skills to perform certain both laboratory and animal tests and is able to interpret them.

Importance of learning outcomes

The student who has passed the course will be able to understand and analyse the fundamentals of Reproduction and Obstetrics as a basis for solving problems associated with it. Knowing in depth both physiological and pathological and technological aspects that affect the reproductive organ function pets will allow students to apply them in their control and management.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate the achievement of the learning outcomes, and therefore the general and specific goals by the following evaluation activities:

1.- Evaluation of theoretical teaching:

It will be 75% of the final grade. It will consist of a Theory Exam

Written tests of theoretical teaching: An examination at the end of the semester will be held as per schedule approved by the Board of the Centre.

It will consist of forty multiple-choice questions and short answer questions (75% of the final grade). Wrong answers not qualify for negative points.

2.- Evaluation of the practical sessions

Attendance at practical sessions is compulsory.

The attendance and participation in all practice sessions is compulsory.

There will be an objective theoretical-practical test that will be assessed up to with 2 points. This theoretical-practical test will be compulsory for all students, whether or not they have attended the practical sessions, and it will represent 20% of final grade.

Students who have not attended all practices, in addition to the test describes above, must demonstrate that they have acquired the necessary practical skills by overcoming a practical exercise (laboratory sessions).

The note obtained in this section will be saved for subsequent courses.

3.- Presentation of group work (seminar sessions)

Attendance at public exhibition of works is compulsory.

Is scored, the exposition of the same (clarity, communication skills and discussion of results, etc.). Will mean up to 5% of the final grade.

The note obtained in this section will be saved for subsequent courses

FINAL SCORES

The final score will be the sum of all evaluation activities

Activity	Percentage of the final grade
Theoretical teaching	75%
Practical sessions	20%
Presentation of work	5%

The student, in order to pass the course, must get these 3 requirements:

- Answer correctly at least 24 of the 40 questions of the theoretical teaching in the examination

- Obtain at least 5 (1 points) in the theoretical-practical test

  Students that have some lack of attendance at practices, in addition to obtaining at least 50% in the theoretical-practical test, must obtain at least 75% in practical exercises (laboratory sessions).

- Present the group work

The scores obtained during the course of the activities described in paragraphs 2 and 3 will remain in the 2nd call of the same course for students who have not passed the subject in the first call. In addition, the note obtained in paragraph 2 and 3 will be saved for subsequent courses.

When student has not pass paragraph 2 and/or 3 in the first call, but has 24 of 40 questions of the written examination of the theoretical teaching, this theoretical note will be save for the second call in the current year.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Test for distance learners or those that arise in other various calls for the first

A final exam will include:

1. Written exam of theoretical teaching (75% of the final grade): It will consist of forty questions of test type and short questions, requiring to obtain at least 24 of the 40 questions. Errors in the test will not be scored with negative points.
2. Evaluation of practical teaching (20% of the final grade): the student must perform a practice exam consisting of an objective theoretical-practical test (requiring pass at least 50%). Practical exercises (laboratory sessions) will be assessed too (requiring pass at least 75%).
3. Evaluation of the presentation of a work. It will be graded up to 5% of the mark.

The final grade is the sum of the notes of each assessment activity.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that is designed for this subject is based on ....

Theoretical knowledge of the main concepts of Animal Reproduction and Obstetrics, and practices at both laboratory and field applications.

Practical activities are aimed scheduled an approximation to reality through observation and direct manipulation, and previous training courses scheduled for the fourth and fifth degree course.

Learning tasks

They will be developed based on:

- Theoretical classes
- Practical classes
- Seminars
- Presentation of work

1.Lectures hours: 40 h

Non-contact hours: 58.5 h.

Teaching-learning methodology:

Participatory teaching lectures. The classes are supported with ICT technologies and traditional systems. Students

have previously graphic material exposed through the virtual platform of the course (Moodle) and deposit notes in the Reprography Service of the Faculty. the participation of students in posing questions or discussion of issues of particular relevance to difficulty or compression of the issues is encouraged.

2. Lab:

Hours: 17 h

Non-contact hours: 8.5 h

Teaching-learning methodology:

A total of 17 hours of practice will be held in the laboratories of Reproduction at the seminar, teaching ship and farms, distributed in 7 sessions of varying lengths depending practice. They will be taught according to the groups scheduled in the middle.

Students will have scripts and specific materials for their understanding and realization.

Initially an explanation recalling the foundation of practice and then the students will practice under constant supervision of teachers will be held. At the end of each session the results will be analysed and the emerging doubts will be resolved.

3. Seminar Sessions

Hours: 4 h

Non-contact hours: 8 h

Teaching-learning methodology:

Complementary activity to strengthen the related concepts with various topics of the subject by exposing papers prepared in advance by each participant group.

Syllabus

1. Program of lectures:

BLOCK I: FUNDAMENTALS OF ANIMAL REPRODUCTION

Unit 1. Introduction: Concept of the subject. Application of anatomical and physiological foundations endocrinological of reproduction in the female.

Unit 2. Puberty and sexual cycle in females. External factors.

Unit 3. Implementation of the anatomical and physiological foundations endocrinological of reproduction in the male. Unit 4. Puberty in male and female hormonal cycle. External factors.

Unit 5. Formation of semen.

BLOCK II: REPRODUCTIVE BIOTECHNOLOGY

Unit 6. Introduction to reproduction biotechnology. Semen collection.

Unit 7. Contrasting seminal. Spermiogram: meaning and evaluation

Unit 8. Dilution of semen. Types diluents.

Unit 9. seminal Conservation: refrigeration, freezing. Thawing.

Unit 10. Types of artificial insemination. Factors governing the success of artificial insemination.

Unit 11. Control of the sexual cycle. Main products used. Management techniques.

Unit 12. In vitro fertilization. Applications.

Unit 13. Embryo Transfer. Methodology transfer in different species. Unit 14. micromanipulation of embryos.

BLOCK III: OBSTETRICS

Unit 15. Concept of obstetrics. Migration of gametes. Survival of gametes.

Unit 16. Fertilisation: phases and stages of fertilization. Anomalies of fertilization.

Unit 17. Segmentation and migration of the embryo. maternal recognition of pregnancy.

Unit 18. Implementation: morphological and endocrinological aspects. Types of implementation. Unit 19. Placentation. Types of placenta. Physiological endocrinology placenta. Umbilical cord.

Unit 20. Gestation. Care of the pregnant female. Development and growth foetal.

Unit 21. Gestation: Diagnostics of pregnancy.

Unit 22. Pelvimetry and foetal position. Valuation methods.

Unit 23. Delivery: Concept. Stages of labour. Management and hygiene. Birth control. Unit 24. Puerperium.

Unit 25. Lactation: Mammary gland. Colostrum. Milk. Artificial feeding.

BLOCK IV: REPRODUCTION PATHOLOGY

Unit 26. Sterility and infertility in the male anatomical, functional and congenital causes.

Unit 27. Interventions in the male reproductive

Unit 28. Sterility and infertility in the female anatomical, functional and congenital causes.

Unit 29. Embryonic mortality. Abortion. Induction of abortion.

Unit 30. Gestation: Mother Diseases

Unit 31. Gestation: Diseases of foetal appendages and foetus. Foetal suffering.

Unit 32. Dystocia. Classification of dystocia. Obstetric manoeuvres. Obstetric material.

Unit 33. Dystocia of maternal origin. Resolution.

Unit 34. Dystocia of foetal origin, non-invasive obstetric manoeuvres.

Unit 35. invasive obstetric spoke on the mother and the unborn baby

Unit 36. Accidents consecutive childbirth. Pathology of puerperium

Unit 37. Pathology of the mammary gland in the male and female

Unit 38. Pathology of the newborn

2. Lab:

1. Artificial insemination techniques in teaching anatomical models Location: Laboratory Genitals. Duration: 3 h

2. Seminal Technology

Place of delivery: Laboratory semen. Duration: 2.5 h

3. Assisted Reproduction: handling of oocytes and embryos Place of delivery: Laboratory embryos Duration: 2.5 h

4. Foetal position and obstetric manoeuvres Place of delivery: Reproduction Seminar Duration: 1.5 h

5. Blockages and obstetric interventions.

Place of delivery: Seminar Playing, teaching ship. Duration: 2.5h

6. Diagnostic techniques in reproduction Place of delivery: Laboratory semen. Duration: 3 h

7. Care delivery

Place of delivery: Livestock farm.

Duration: 2 hours

Course planning and calendar

The dates and key milestones of the subject are described in detail, along with the other subjects in the third course in the Degree of Veterinary Medicine, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es / gradoveterinaria /). This link will be updated at the beginning of each academic year.

Safety standards in practice

PROPER ATTIRE: each of the practices should be assisted with proper clothing:

- Teaching farm: overalls, reinforced boots and mask and protective glasses if necessary
- Laboratory: glasses, mask, lab coat
- Students collaboration: lab coat

(http://uprl.unizar.es/seguridad)

The dates and key milestones of the subject are described in detail, along with those of other subjects of the degree of Veterinary Medicine, on the website of the Faculty of Veterinary Medicine (link http://veterinaria.unizar.es/gradoveterinaria/) . This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28428

Universidad Zaragoza

Year: 2018/19

28429 - Ruminant Integrated Course

Syllabus Information

Academic Year: 2018/19
Subject: 28429 - Ruminant Integrated Course
Faculty / School: 105 -
Degree: 451 - Degree in Veterinary Science
ECTS: 14.0
Year: 4
Semester: Annual
Subject Type: Compulsory
Module: ---

General information

Aims of the course

The general aim of this subject will be the learning of the main aspects on which the Production, Clinic and Health of Ruminants is based. To achieve this general objective, the specific learning objectives of the subject will focus on achieving that the student is able to know, understand and / or apply:

- The bases of animal production: traditional and current systems.
- The raw materials essential for the feeding of ruminants.
- The bases of animal nutrition, rations formulation and feed manufacturing.
- Genetic applications to programs of improvement and health.
- Reproductive strategies and procedures applied to production.
- The fundamentals of livestock facilities and environmental hygiene.
- The economy of the productive process and commercialization.
- Sustainable development
- Childbirth and puerperium: care and associated pathologies.
- The methods and procedures of clinical examination and its interpretation.
- The etiology of the different pathologies that affect the different devices or systems of ruminants.
- Diagnostic procedures for diseases: clinical, anatomopathological or laboratory.
- The different methods of fight against diseases of ruminants, both preventive and curative, including medical, surgical or hygienic-dietary treatments appropriate to each one of them.
- The diseases of ruminants transmissible to man and diseases of compulsory declaration, with special veterinary interest, including their diagnosis, control methods and legal approaches that regulate them.

Context and importance of this course in the degree

The subject "Ruminant Integrated Course" like the rest of integrated course subjects, is performed on the fourth year of the Degree in Veterinary Medicine, specifically throughout the seventh and eighth semesters and it includes the Production, Clinic and Health of the Ruminants.

To develop correctly, it is necessary to have completed previous and basic subjects such as: Embryology and Anatomy I and II, Ethnology and Animal Welfare, Economics and Business, Epidemiology and Biostatistics, Cytology and Histology, Agronomy, Animal Physiology, Genetics, Microbiology and Immunology, Animal Nutrition, Parasitology, Legal Veterinary Deontology and Bioethics, General Pathological Anatomy, Reproduction and Obstetrics, General and Propedeutic Pathology I and II, General Surgical Pathology, Surgery and Anesthesiology, Diagnostic Imaging, Toxicology, Pharmacology and Pharmacotherapy.

With all these bases and the subject itself, students acquire the basic competences on production, clinical and health of ruminants, so necessary for the professional performance and for a better use of the Practicum of Ruminants and the Post-mortem Diagnosis that will have to develop in the fifth year of the Veterinary Degree.

Recommendations to take this course

In order to take this course it is particularly necessary that the student either has completed all the subjects of the previous courses or is enrolled in those failed ones.

Competences and Learning outcomes

Competences

Once successful completion of this course, students will be able to:

- Discern and evaluate the most important diseases in the different species of livestock ruminants; knowing the etiology, epidemiology, pathophysiology, clinical signs, lesions of each process, in such a way that manages measures of treatment, prevention or control to minimize risks at the livestock level
- Critically analyze the factors that intervene in the different ruminant production systems, including technical-economic management and sustainability, genetic improvement, rationing and formulation of food rations, the use of pastures and fodder, as well as the quality of the products obtained.
- Make decisions that allow reaching the objectives that may arise in the production systems of ruminants.
- Analyze the importance and repercussions of ruminant diseases in the field of Public Health

Learning outcomes

If students complete the course successfully, they should be able to:

1. Know and understand the strengths and weaknesses of the bovine and ovine sectors in Spain, the socio-economic and structural constraints of ruminant production and the marketing of their products, with reference to legislative, geographic, sanitary and environmental frameworks.
2. Know the production systems, the reproductive calendars, the handling of the animals and the management of the feeding in each phase of the productive cycle.
3. Include the characteristics of accommodation and facilities and their impact on the different ruminant's production systems.
4. Understand the factors that influence the quality of products.
5. Know how to apply technical-economic management methods and sustainability analysis in ruminant farms.
6. Know the objectives and selection criteria, as well as the techniques used in the genetic improvement of ruminants, with respect to the different characters and genetic parameters.
7. Develop the ability to make genetic improvement decisions, through the integration of available information sources (phenotypic, molecular).
8. Design rations and formulate the concentrated feed necessary to cover the requirements of ruminants according to the production system and phase of the productive cycle.
9. Know, for each production system, the main types of pastures and forages involved and their use, as well as the environmental services provided by these systems.
10. Know the diseases of ruminants, their etiopathogenesis, epidemiology and clinical.
11. Address the diagnosis of any pathological problem that affects ruminants: choose the most appropriate samples and diagnostic techniques in each case and interpret the results.
12. Establish and apply the most appropriate treatment to each pathology and establish prevention and control measures that prevent the appearance of the most important diseases of ruminants.
13. Know and understand the characteristics and reproductive control of ruminants and the mechanisms involved in delivery, as well as the treatment of problems associated with it.
14. Prepare a medical history and a veterinary report.

Importance of learning outcomes

The knowledge obtained through the subject "Integration in Ruminants" is the fundamental basis on which the training of the veterinarian dedicated to the production of ruminants and which ranges from the different production systems to the clinic and the health, being useful and necessary because that this learning is more oriented towards a

practical activity.

Likewise, this knowledge is basic for the training of the veterinarian dedicated to Public Health, in order to perform functions related to control programs (control, eradication or prevention), mainly referred to zoonotic diseases, and food quality and safety, in reference to the foods that have their origin in ruminants.

Likewise, this learning is necessary for the official veterinarian when applying legal aspects related to the regularization of livestock facilities, animal movements, sanitary programs, etc.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he has achieved the expected learning outcomes through the following assessment activities:

Evaluation of learning outcomes:

1. In each semester, at the end of the academic period, there will be a midterm exam that will consist of short answer questions and/or multiple-choice questions that will correspond to the theoretical and practical sessions. The theoretical test will suppose 70% of the qualification of the subject.
2. Two assignments: a clinical report and an analysis of a livestock farm that will be assessed and each one will represent 15% of the final grade of the subject.
3. In the practice 16, students will submit a veterinary report based on the information obtained in practices 8, 9 or 11 and 15. It will represent a 15% of the final grade. This work will be done in groups and will be based on the work done in practices.

In the practices 1 to 18 will be assess the student's attendance, and its contents may be asked in the written theoretical test.

The final qualification requires the passing of each of the midterm exam. In the first midterm exam there are different theoretical blocks and it´s compulsory to obtain, at least, a minimum of 25% on each, but if the student fails this mentioned exam and passes the practical exam, the later will be saved for future.

The global assessment is a written exam that consists of (proportional to the different contents) short answer and/or multiple-choice questions that will correspond to the theoretical and practical sessions, wrong answers will score negative in some blocks of the first midterm exam.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives.

The learning process designed for this subject is based on: lectures, practices, visits to livestock farms and team works that favor the development/acquisition of competences explained in section 2.1.

A wide range of teaching and learning tasks are implemented:

- **Lectures**: 115 hours, including an introduction class and presentation of the subject. Theoretical lessons will be taught in the lecture room, being the students divided into two groups.
- **Practice lessons (I)**: 52 hours. These will be given at the Animal Research Service teaching room of the Veterinary Faculty; at the Research Centre of the Aragón Government (CITA); at the regional Slaughter House: Mercazaragoza; at the computer room; at the teaching laboratories of Infectious, Parasitic Diseases and Animal Production and at the necropsies room. Practices are divided into 10 sessions of 1 to 3 hours long,

received by groups of 6-8 students and 13 sessions of 1 to 1.5 hours long, received by groups of 12-14 students. A work explanation will be given at the beginning of the lesson. The students will do the practice under the professor's supervision afterwards. The students will have guide notes and specific materials for its understanding and execution.

- **Practice lessons (II)** 8 hours: 2 seminars (the whole group), a cattle prospecting work (groups of 2- 4 students) and a visit to a bovine or ovine livestock farm.

Students are expected to participate actively in the class throughout the both semesters.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials, including a discussion forum.

Further information regarding the course will be provided on the first day of class.

Learning tasks

This is a 14 ECTS course, organized as follows:

AF 1: 115 lectures for 94 topics, described in section 4.3.

The first part of the subject is more focused on production, with different sections oriented to bovine or ovine needs. The second part is oriented to pathology, and organized in sections by the different systems.

AF 2: 60 practice lessons described in section 4.3.

The practice have different modalities: practice with computers, laboratory sessions, in a teaching ship, visits to farms, seminars and practice sessions for the exposition on two reports that students have to develop during the course.

With the development of these activities the student will be able to reinforce the knowledge acquired in the theoretical classes.

Syllabus

LECTURE SESSIONS

This programe consists of 94 topics to teach in 115 contact hours' participatory lecture, distributed in 1-hour sessions.

0. Introduction

1. The beef sector in Spain and Europe: Censuses, territorial distribution, production and demand. Marketing and support policies

2. Reproductive control.

3. Application of reproduction biotechnologies.

4. Reproductive failure.

5. Diseases of the female genital apparatus.

6. Attention to childbirth and obstetric problems. Placental retention

7. Diseases of the genital system of the male.

8. Abortions of infectious etiology in cattle and small ruminants.

9. Abortions of parasitic etiology in cattle and small ruminants.

Beef cattle

10. Meat production in extensive systems: Justification. Problems. Reproductive management. Production models: high mountain areas. Grasslands. Plateau areas. Humid areas.

11. Grasslands and forages: main types in bovine and ovine systems. Stocking rates of each type. Grazing systems and their advantages and disadvantages.

12. Meat production in intensive systems: Types of production. Veal, beef, mutton, ox. interest.

13. Beef cattle and beef cows feeding: growing and fattening periods. Feeding during reproduction.

14. Growth promoters and terminators: Types of products. Effects. Consequences in carcass and meat. Interest and problems.

15. Carcass and meat quality: Concept. Carcass performance. Conformation. Composition. Carcass classification. Main parameters of meat quality.

16. Facilities: General Designs (free housing and communal boxes). Complementary facilities. Facilities for fodder

17. Goals and criteria of breeding. Analysis of the traits.

18. Breeding schemes. Genetic evaluation of candidates for selection.

Dairy cattle

19. General characteristics: Milk production systems. Structure. Animal bought. Lactation curves
20. Productive and reproductive management: characteristics. Goals. Postnatal cares. Artificial Lactation. Replacement. Livestock farm control. High-production cattle management.
21. Milk production: factors that influence. Milking: phases, times and hygienic conditions
22. Dairy cattle feeding
23. Housing and Facilities: Characteristics. Types of stabling. Facilities for breast-fed calves. Facilities for distribution of food and water. Milking rooms.
24. Nipple diseases and udder oedema
25. Clinical udder inflammation in cattle
26. Subclinical udder inflammation in cattle
27. Control of udder inflammation in cattle
28. Organization of genetic improvement. Breeder's associations. Goals and criteria of selection.
29. Analysis of the traits. Genetic evaluation of candidates for selection.
30. Biotechnology and genomic selection.

Sheep and goat

31. Management of cattle and sheep farming systems. Technical and economic indicators and farm sustainability.
32. Sheep and goat livestock sector in Spain and Europe: census, distribution, productions and demand. Marketing and support policies.
33. Management systems: intensive and extensive. Types. Differences. Trashumance.
34. Reproductive management: Calendars and systems. Use of hormonal and non-hormonal treatments and ram effect.
35. Lamb management: first cares. Artificial rearing. Weaning. Fattening. Replacement
36. Dairy sheep: Reproductive management. Milking. Drying-off
37. Feeding of growing and fattening lambs
38. Feeding of the meat- and milk-producing ewe
39. Meat and dairy sheep facilities: General Designs. Complementary facilities. Milking rooms.
40. Clinical udder inflammation in small ruminants (agalactia).
41. Control of udder inflammation in small ruminants
42. Goals and criteria of genetic improvement in sheep meat. Analysis of the traits.
43. Breeding schemes in sheep meat. Genetic evaluation of candidates.
44. Breeding schemes in sheep and goat milk. Genetic evaluation of candidates.
45. Environmental benefits of the ruminant systems.

Clinical training and animal welfare

Systemic Pathologies

46. BVD, pestivirus
47. Bacterial and symptomatic carbuncles.
48. Brucellosis.
49. Blue language.
50. Rift Valley Fever, PPR.
51. Malignant catarrhal fever, foot-and-mouth disease.
52. Tuberculosis, perineumonia.
53. Transmissible spongiform diseases

Respiratory system pathology

54. High respiratory tract and eyes.
55. Pasterelosis.
56. Oestrosis, vermilion bronchopneumonia, dictiocaulosis.
57. Maedi Visna, CAE.

58. APO, pseudotuberculosis.

Digestive system and abdomen Pathologies

59. Lesions of the digestive system.

60. Paratuberculosis.

61. Trichostrongilidosis and toxocariosis

62. Fasciolosis and dicroceliosis

63. Schistosomiasis.

64. Cysticercosis. Hydatidosis

65. Enterotoxemias.

66. Oral, mandibular and esophageal lesions

67. Indigestion: simple, acidosis and alkalosis.

68. RT, vagal indigestion, impaction.

69. Tympanism, peritonitis, ruminal fistula

70. Abomasal diseases and DA resolution

71. Abomasal surgery

Udder pathology

72. Milking pathology in milk bovine.

73. Milking pathology in sheep.

Diseases with nervous symptoms

74. Bovine nervous system diseases.

75. Diseases of the ovine nervous system.

76. Listeriosis. Luoping ill.

77. Nervous system injuries.

Blood pathology

78. Theileriosis, Babesiosis.

Urinary system pathology

79. Leptospirosis, bacillary hemoglobinuria.

80. Urinary system pathology.

Skin and muscle tissue pathology

81. Sarcocystiosis and besnoitiosis.

82. Ectoparasites.

83. Smallpox, Lumpy skin.

Podal diseases

84. Lameness in small ruminants (pedero).

85. Lameness in cattle.

Young animal diseases

86. Hypothermia, starvation, omphalitis, ecthyma, otitis.

87. Polyarthritis, pseudotuberculosis, white muscle, abscess disease.

88. Sheep respiratory complex.

89. Coccidiosis.

90. Cryptosporidiosis and giardiosis.

91. Calves diarrheal syndrome.

92. Bovine Respiratory Syndrome.

93. IBR.

94. Digestive system lesions.

PRACTICAL ACTIVITIES: 60 hours

Practices type I (at farms, slaughterhouse, laboratories, computer room and necropsies room) (52 hours)
Practices type II (seminars, clinical cases, works and visits to livestock farms) (8 hours)

Practices type I

Practice 1- Formulations of rations for:

a) Growing beef cattle
b) Dairy cattle
c) Pregnant and lactating ewes and growing lambs

Practice 2- Computer management of information

a) Meat
b) Milk

Practice 3- Genetic management of a herd

Practice 4- Cost calculation and break-even analysis in dairy farms.

Practice 5- Ovine milking management

Practice 6-Carcass and meat quality

a) carcass
b) meat

Practice 7-Technical and economic indicators and sustainability assessment in meat sheep and beef cattle farms.

Practice 8 - Introduction to clinical practice

Practice 9- Clinical cases and podiatry

Practice 10-Applied ruminants reproduction

Practice 11- Clinical cases and diagnosis of respiratory diseases

Practice 12 - Clinical cases and diagnosis of digestive diseases

Practice 13 - Mastitis

a) Clinical cases and diagnosis of udder diseases
b) Diagnosis of infectious udder diseases

Practice 14 - Examination and pregnancy diagnosis in ruminants

Practice 15 - Post mortem studies in ruminants

Practice 16 - Laboratory diagnosis of infectious diseases of the reproductive system. Joint clinical sessions: preparation and discussion of a report

Practice 17-- Laboratory of Parasitology I: protozoan parasites 18-- Laboratory of Parasitology II: metazoan parasites

Practice 19 - Joint clinical sessions: preparation and discussion of a report 20 - Presentation of the livestock research

Practices type II

Practice A; Fieldwork (livestock research)

Practice B; Visit to livestock farm (C1- Sheep and C2-Bovine) or taking part in the activity "trashumance"

Seminar I; Welfare programmes in small ruminants Seminar II; Welfare programmes in cattle

The programme is enhanced by:

- Study for the consolidation of knowledge. Preparation for the exams and requested works.
- Tutorials
- Taking tests and doing presentations.

Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Veterinary Faculty website (http://veterinaria.unizar.es/gradoveterinaria/).

This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28429

Universidad Zaragoza

Year : 2018/19

28430 - Poultry and rabbit integrated Course

Syllabus Information

Academic Year: 2018/19

Subject: 28430 - Poultry and rabbit integrated Course

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 8.0

Year: 4

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The subject and its expected results respond to a single approach and objective: the ability of the graduate student to respond to the needs and requirements of the poultry and rabbit sectors. For this reason, it must demonstrate the learning results indicated below.

Context and importance of this course in the degree

As it is a 4th year subject, it is guaranteed that the students have a basic training on the characteristics of animals in general (Anatomy, Physiology, Ethnology, ...), so that they are already prepared to place these species in their meat and egg production aptitudes.

Spain is one of the most important European countries in the production and consumption of eggs, poultry and rabbit meat; the same happens with the Autonomous Community of Aragon at national context. Therefore, it is the student´s interest to know the breeding methods and the health problems of these species with a view to their future professional possibilities.

In addition, the Biology and Ethology of the rabbit with meat purpose are similar to those of the pet, laboratory or wild rabbit; something similar happens with the poultry used in the commercial production of meat and eggs in relation to the wild ones and with those bred for hunting, sports or simply for hobby purposes. Therefore, this subject can be useful for the training of future veterinarians in the breeding and health care of animals of these other skills.

Recommendations to take this course

Having passed most of the core subjects of the 1st, 2nd and 3rd courses, in particular Anatomy, Ethnology and Animal Welfare, Physiology, Nutrition, General and Quantitative Genetics, Microbiology, Epidemiology, Parasitology, Medical Pathology, General Pathology and Reproduction.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Assess the state of health and welfare of birds and rabbits (general and specific signs of health and disease).
- Evaluate whether the feeding, handling and housing of birds and rabbits are adequate or not, and propose improvement programs, or corrective measures where appropriate.
- The same applies to hygienic and prophylactic measures applied at farm level.
- Avoid being a vector of diseases (personal hygiene and biosecurity measures).
- Master the necropsy technique, the interpretation of observations, and their integration with other data of

diagnostic interest.

- Obtain in vivo (especially blood) and post-mortem as well as environmental samples of feed and products, decide on the most appropriate analyses, and send the samples to the laboratory under appropriate conditions.
- Interpret laboratory results.
- Decide and apply the appropriate therapeutics in each case, and apply the necessary vaccines by their various routes of administration.
- Perform euthanasia in birds and rabbits, individually and massively.

Learning outcomes

If students complete the course successfully, they should be able to

- Know and understand the egg, poultry and rabbit meat production systems, and their conditions and circumstances.
- Assess the health status and welfare conditions of animals, and establish critical judgement and proposals for improvement on their housing, feeding conditions, and reproductive and handling techniques.
- Recognize the most frequent pathological processes in these animal species of infectious, parasitic, metabolic origin, or related to the environment, food and reproductive and general management normally used; and assess and propose the preventive and therapeutic measures applied or applicable.
- Assess and establish a critical judgement and proposals to improve the productive and sanitary results of the animals.

Importance of learning goals

These animal species present a physiology very different from that of other animals, a short productive cycle, and a high technological level in their production conditions; all of them characteristics that imply a peculiar and usually novel husbandry dynamic for students.

The great interrelation that exists between the physiology of these animals and their possibilities and conditions of production stimulates the students to analyze when it is convenient to replace the concept of maximum by optimum, an important aspect also in daily life. They can also learn to evaluate how the adaptation of breeding techniques to the behaviour patterns of these species results in benefits for the animal, in a better organisation for the farmer, and in the improvement of the quality of life of both.

Other foreseeable results of learning this subject consist of becoming aware of the effects of different factors linked to husbandry methods on the quality and food safety of eggs, poultry meat and rabbit meat, products with high consumption in Spain; it is of great importance to consider the economic context of these productions - increasing costs and low prices, in a very competitive environment - so that the proposals and decisions of future professionals also contribute to the achievement of profitability and productive efficiency, an essential goal to achieve and maintain employment in companies in these sectors.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities:

- The knowledge and understanding of the theoretical and practical contents will be assessed with a written examination on the official dates, at the end of each school year.
- At the end of the first four-month period there will be a partial examination, free of matter, which will include rabbit contents; the second partial and the final examination, for students who have not passed the first, will be held at the end of the second four-month period.
- In all cases the theoretical examination will consist of brief descriptive questions, to be answered concisely.
- Practical skills will be assessed using a variety of methodologies:
- A written practical examination will be held on the official dates, on the same day as the theoretical examination.
- For contents related to practices in general, and to clinical and zootechnical cases, the practical examination shall be based on questions and problems to be solved. For contents related to clinical and anatomical-pathological diagnosis, a practical examination will be carried out based on photographs to be commented

on.

- The resolution and public presentation of clinical cases of avian pathology prepared in teams by the students will be evaluated in 3 sessions held towards the end of each school year.
- The attitude and skills demonstrated in the practical sessions and the discussion of clinical and zootechnical cases will be evaluated by the teachers throughout the course.
- The ability to solve problems and handle information will be evaluated on an ongoing basis, proposing to all students specific questions that must be answered and presented in writing in a concise manner.
- Attendance at theoretical and practical sessions will be controlled and computable

Valuation criteria and requirement levels

Written examination 70%

Continuous assessment 30%.

Ongoing evaluation includes:

Resolution of case studies in class 6%.

Exposition of practical cases carried out in team 18%.

Attendance controls and positive and participative attitude (practices) 6%

To pass the exam, it is required to obtain at least 50% of the possible points for the theoretical and practical contents as a whole, and not less than 40% of the possible points in each of the four sections of the program (Avian Production and Pathology, Rabbit Production and Pathology).

In case of not passing the whole exam, the grades obtained in the past sections will be kept during the same academic year.

The subject is passed with a grade equal to or higher than 5 points out of 10.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Global test

Theoretical and practical knowledge will be assessed by means of a final exam that will cover all the contents taught in the subject.

Pupils who have not attended a minimum of 85% of the total number of face-to-face placements must prove that they have acquired the practical skills corresponding to the teaching not received by means of a specific examination. Therefore, this examination may include the demonstration of skills in the handling of animals and laboratory techniques, the ability to resolve clinical and zootechnical cases, and any other aspect developed in those face-to-face practices in which the students have not participated.

The evaluation criteria for these students will be: Theory, 70%, and practice, 30%.

The theoretical examination consists of four sections (Avian Production and Pathology, Rabbit Production and Pathology). To pass the exam, it is required to obtain at least 40% of the possible points in each of the four sections of the program and, at least, 50% of the possible points for the theoretical and practical contents as a whole. The exam will be adapted to the subjects taught in the corresponding academic year.

If you do not pass the whole of the exam, the marks obtained in each section passed will be kept during the same academic year.

For those students who present themselves in other examinations than the first, the evaluation, evaluation criteria and level of demand will be the same as in the first exam.

Methodology, learning tasks, syllabus and resources Methodological overview

The learning process that has been designed for this subject is based on a combination of

several methods:

- Teachers' theoretical lectures, supported by the publication of abstracts and supplementary material in the ADD to favor previous study and participation in class of students.

- Practices in farm and laboratory, to achieve mastery by the students of practical skills essential to acquire the corresponding professional competences.

- Discussion and resolution of clinical and zootechnical real cases, in order to increase their ability to analyze and solve common problems in professional practice, including the search for relevant information. Some of them must be resolved and publicly exposed by the students themselves.

In general, the planned teaching methodology, especially the weight given to clinical and zootechnical cases, aims to promote the use of very diverse technical and scientific information, analysis and synthesis thereof, real problem-solving ability, and presentation of proposals and results, both individually and as a team.

Learning tasks

The theoretical classes in both species include contents of production and of animal health in a balanced way. Those related to rabbits will be given before those of poultry, and in both cases those related to animal production will precede those related to animal health.

Practical activities, which may begin before the end of the theoretical classes, include

A) farm management practices (7 h in poultry farming and 2.5 h in rabbit husbandry);
B) laboratory practices of embryodiagnosis and egg quality control (4 h);
C) clinical diagnostic practices (9 h in poultry and 2 h in rabbit);
D) reproduction technology practices (2 h in rabbit);
E) discussion of zootechnical and nutritional cases (4 h in poultry and 1 in rabbit);
F) discussion of clinical cases (2 h in poultry farming and 0.5 h in rabbit breeding);
G) presentation by students of clinical cases in avian pathology (2 h);
H) seminar on more frequent pathologies and prophylaxis in the current rabbit husbandry (2 h).

The theoretical and practical classes will be adapted to the corresponding Academic Calendar. There will be a total of 64 theoretical sessions and 38.5 hours of practice per student.

Syllabus

Degree (MECES 3)

Course planning and calendar

The key dates and milestones of the subject are described in detail, along with those of the rest of the subjects in the fourth year of the Veterinary Degree, on the website of the Faculty of Veterinary Medicine (link:

http://veterinaria.unizar.es/gradoveterinaria/). This link will be updated at the beginning of each academic year.

With respect to the calendar, the following tables reflect the approximate order of teaching of the different subjects:

CUNICULTURE

Activity	Lecture hours*	Practice hours	Group Size
Rabbit production	8,5		75
Practice session in rabbit farms A- facilities		1	12
Practice session in rabbit farms B- handling		1,5	6
Pathology Theory and Reproduction in rabbits	6,5		75
Practice session in reproduction A		1	6
Practice session in reproduction B		1	6
Parasitological diagnostic practice session		1	12
anatomy-pathological diagnosis practice session		1	36
Practice case session		1,5	6
Cuniculture workshop		2	75
TOTAL	15	10	

*18 sessions of 50 minutes each

POULTRY

Activity	Lecture hours	Practice hours	Group Size
Poultry production	21		75
Poultry production practice cases		2	24
Poultry feeding practices		2	12
Embryodiagnosis practices		2	12
Egg quality control practices		2	12
Practice of biosafety assessment, housing		1.5	6
Broilers managing practice		6	6
Poultry Reproduction and Pathology Theory	17,5		75
Parasitological diagnostic practices		2	12
Practical medical pathology		1.5	6
Laboratory diagnostic practices		1	6
Serological diagnostic practices		1,5	12
Differential anatomo-pathological diagnosis Practice		2	75
Practical clinical cases		3	6
Clinical cases sessions		2	12
Presentation of clinical cases by students (group of 6)		2	24
TOTAL	38,5	30,5	

*46 sessions of 50 minutes each

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28429

Universidad Zaragoza

Year : 2018/19

28431 - Small Animal Integrated Course

Syllabus Information

Academic Year: 2018/19

Subject: 28431 - Small Animal Integrated Course

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 14.0

Year: 4

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The general goal of this subject is learning the most important diseases which affect cats and dogs, knowing the right diagnosis protocols and choosing the right preventive and therapeutic program.

To achieve these goals, students should be able to:

- Obtain all the information that it will be required in a sick patient.
- Obtain the maximum number of symptoms, trhought medical history and exploration techniques, and know how to interpret its meaning.
- Define different clinical patterns that could appear in the medical history and exploration.
- Stabilize a relationship between the possible reasons that could produce the disease and compare them.
- Choose the diagnostic test that could be necessary to reach a diagnosis.
- Select the right treatment for each case.
- Make surgery procedure if they are necessary.
- Make a complete pre-operative examination
- Anesthetize and apply anesthetic monitoring.
- Be familiar with CPR procedure and be able to control the common surgery complication.
- Be able to control the postoperative pain management.
- Identify medical emergencies and treat them.
- Take care and treat hospitalized patient.
- Make preventive programs against infection and parasitic diseases.

Context and importance of this course in the degree

Students will study this subject in the fourth course because they should have a wide knowledge of Anatomy, Physiology, Immunology, General Pathology and Propaedeutic, Surgery, Anesthetic... The foundations of this subject are anatomical pathology, infection and parasitic diseases in dogs and cats, clinical pathology, reproductive diseases and their treatment and the most important surgery procedures. In the final year, students will complete their knowledge in this subject with the practicum.

Recommendations to take this course

It is highly recommended that students have coursed all the previous year's subjects and they should pass Anatomy, Physiology, Microbiology and Immunology, General Pathology and Propaedeutic, Anatomical Pathology, Surgery, Pathology of Reproductive System, Veterinary Parasitology and Diagnostic Imaging. It is necessary to have a solid knowledge in these fields to be successful in Small Animal Clinical and Pathology Diagnosis

On the other hand, it is very important that students participate actively in their compulsory practice.

Competences and Learning outcomes

Competences

On successful completion of this course, student should be able to:

- Use different kinds of medical procedures and techniques according to each case.
- Explain the results which are obtained with different procedure and using diagnose techniques
- Recognize and diagnose different kinds of injuries and be able to associate them with specific pathologies.
- Diagnose the most common disease in domestic animals.
- Be able to prescribe and dispense drugs in a safety way according to the law.
- Be able to make common surgery procedure.
- Be able to make in a safety way anesthetic procedure as general anesthetic, regional anesthetic and sedation, and control the pain.
- Be able to treat emergency situation and first aid.
- Be able to detect infectious illness.
- Use assisted animal reproduction and control the pregnancy, birth and postpartum period.
- Be able to recognize when it is necessary to do euthanasia and make it in a humanitarian way.

Learning outcomes

If students manage to complete the course, they should be able to:

1. Make a methodical, systematic and complete medical history of sick animals.
2. Know which clinical symptoms they should pay attention after a physical examination.
3. Analyse the most relevant aspects of the medical record and the physical examination to be able to identify the problem.
4. They should be able to make a list of differential diagnosis for each one of the most common symptoms in dogs and cats.
5. Know the diagnosis and prognosis of the most common diseases in cats and dogs.
6. Know the most common and frequent diseases in cats and dogs.
7. Use and understand the common diagnosis techniques to be able to identify the most common diseases in cats and dogs.
8. Use properly therapeutic protocols for each case and they ought to know the beneficial effects for each drug and their side effects.
9. Know and put into effects the most common surgical and anaesthetic procedures, taking into account the risk of each patient.
10. Take into account the different aspects of the reproductive system in cats and dogs. Also they should identify and treat the health problem that could happen in neonate animals.
11. Know and use preventive programs against the most common diseases in cats and dogs.
12. Identify and evaluate if a patient needs emergency care and they should know how to stabilize the patient.
13. Use different diagnostic procedures (ante-mortem and post-mortem), and they should be able to make medical certificates and send samples for other studies.
14. Draft correctly medical and pathological report and they should be able to explain the medical procedures.
15. Be able to manage the information sources in which the most common veterinary diseases are explained.

Importance of learning goals

The content of this course is essential for the student to acquire the knowledge and skills necessary to develop, in their professional life, clinical activities in the field of pets, since in this All aspects related to the application of diagnostic techniques, identification of syndromes, application of medical and surgical treatments, establishment of preventive measures, elaboration of reports will be addressed... That is to say, it brings together in a systematic way the most important knowledge around the clinic of dogs and cats.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

- Two written tests consisting of short answer questions (50%) and multiple-choice questions (1 true choice and 3 false answers) (50%) on the content of the theoretical program. One test will be taken in

January/February, and the other in the final exam in June. Theoretical tests will account for 70% of the subject grade.

- One test to assess the practical activity, solving 15 clinical problems on the sort of cases in which students have participated in clinical consultations, clinical sessions and seminars. In order to take the practical exam, a minimum of 80% of attendance is required. This evaluation will suppose 30% of the qualification of the subject.
- To pass the subject the student must obtain in the written test a minimum of 50% of the examination score and in the practical part must reach a minimum of 50% of the score.
- The score of the evaluation of the practical part will be maintained, if so requested by the student, for future calls.

Global Test

The overall test will consist of a written part consisting of 120 questions (maximum 70% of the mark) plus the practical test score (30% of the mark).

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that has been designed for this subject is based on the following:

Theoretical classes, practices, case discussion seminars, papers, presentation of clinical cases

- Theoretical classes: 120 hours of theoretical classes of magisterial type will be given. They will be given in the classroom determined by the Centre, with the students divided into two groups.
- Practical classes: A total of 55 hours of practice will be given in the consulting rooms and operating theatres of the Veterinary Hospital of the UZ, in the laboratories and necropsies room of Pathological Anatomy (Classroom Building), in the teaching laboratories of Infectious Diseases and Parasitology (Hospital building, first floor, third corridor). The practices will be distributed as follows:

20 hours of Internal Medicine clinics (in consultations 1, 2, 5 and 6 of the Hospital)

* 12 clinical hours of Surgery (in consultations 3, 4, 7 and surgical unit of the Hospital)

* 8 clinical hours Reproduction (in consultation 8 of the Hospital)

* 5 hours of Seminars, clinical sessions, Histopathology laboratory (in Pathological Anatomy Unit, classroom building)

* 5 hours of seminars and discussion of cases and preventive programs of Infectious Diseases (Seminar room and infectious teaching laboratories on the first floor of the Hospital building).

* 5 hours of interactive seminars on cases and preventive programs of Parasitic Diseases (Seminar room of the teaching unit of Parasitic Diseases first floor of the Hospital building)

Learning tasks

Theoretical classes, practices, case discussion seminars, papers, presentation of clinical cases

Syllabus

THEORETICAL PROGRAMME 120 Hours

Skin diseases (12h)

1. **General approach to diagnosis in skin diseases**
2. **Pruritic skin diseases parasitic origen**: Sarcoptic mange, trombicula, Notoedrex mange, Cheyletiella.

Clinical aspects, diagnosis and treatment.

3. **Canine and feline demodicosis**. Clinical aspects, diagnosis and treatment.
4. **Dermatophytoses**. Clinical aspects, diagnosis and treatment.
5. **Atopic dermatitis, food hypersensibility, contact allergy**. Clinical aspects, diagnosis and treatment.
6. **Flea allergy**, Insect byte hypersensibility and ticks. Clinical aspects, diagnosis and treatment.
7. **Canine alopecia**. Clinical presentations, diagnosis and treatment.
8. **Superficial and deep pyoderma**. Clinical aspects, diagnosis and treatment.
9. **Immunemediated dermatosis**. Penphigus complex, Cutaneous lupus, Clinical aspects, diagnosis and treatment.
10. **External Otitis**. Diagnostic approach ant treatment.
11. Ablation of the bulla, otohematoma and surgery of the skin folds.

Ophthalmology (5 hours)

1. **Ophthalmology patient approach**. Main disorders in a diseased eye. Basic eye examination. Diagnostic methods.

Changes in eyeball appearance: Exophthalmos, enophthalmos, eyeball prolapse, neoplasias, retrobulbar abscesses.

2. **Changes in the eye discharge**: keratoconjunctivitis sicca, conjunctivitis, uveitis. Epiphora.
3. **Painful eye**: superficial, deep and descemetoceles corneal injury. Uveitis.
4. **Red eye**: conjunctivitis, uveitis, corneal neovascularization, glaucoma.
5. **Loss of vision, blindness**: Glaucoma, Causes of blindness due to passage problems of light (Keratitis, neoplasia, cataracts, retinal causes of blindness and extraocular causes).

Gastroenterology (14 hours)

1. **Mouth-esophagus:** clinical aspects, diagnosis and treatment.
2. **Lip and tongue pathology:** Lip folds, lip and tongue surgery. Dental pathology: Periodontal disease, fistulas. Dental fractures Cavities. Retention of baby teeth. Dental extractions vs. Conservative treatment. Inflammatory diseases of the cat oral cavity. Salivary glands: Sialoceles.
3. **Diseases of the esophagus and dysphagia.** Megaesophagus, foreign bodies, perforations, narrowings, obstructions, diverticula, fistulas. Hiatal Hernias Diagnosis, prognosis and treatment.
4. **Esophageal resection and anastomosis techniques.** Resolution of fistulas, diverticula, restrictions and hiatus hernias. Forced feeding. Pharyngostomy tube Postoperative care and complications of esophageal healing.
5. **Stomach diseases.** Vomiting: etiology, diagnosis and treatment. Gastritis, foreign bodies**.**
6. **Surgical resolution of dilation-** torsion, gastric syndrome. Gastrectomy. Surgical techniques.
7. **Bowel diseases.** Acute and chronic diarrhea: etiology, diagnosis and treatment. Inflammatory
8. **Enterotomies.** Resolution of intestinal obstructions. Aftercare and complications**.**
9. **Anorectal diseases.** Stool retention, proctitis, perineal hernias, foreign bodies, fistula.
10. **Liver pathology,** liver and gallbladder disorders. Feline hepatic lipidosis. Portosystemic
11. **Liver and gallbladder surgery**. Liver biopsy and hepatectomy, portosystemic communications
12. **Pancreas diseases. Acute and chronic pancreatitis; exocrine pancreatic insufficiency (IPE**
13. **Peritonitis.** Etiology, diagnosis and treatment**.**
14. **Hernias**. Inguinal, umbilical, abdominal, ventral. Symptoms, diagnosis and surgical treat
15. **Dog and cats differential diagnosis of most common necropsy lesions in: mouth, esophagus, stomach, intestine and peritoneum**
16. ***Dog and cats differential diagnosis of most common necropsy lesions in liver and pancreas.***

Urinary diseases (9 hours)

1.-Introducion to structural pathology of renal pathology.

2. Glomerulonephritis and nephrotic syndrome: symptoms, differential diagnosis of glomerular
3. Chronic kidney disease (CKD): symptoms and diagnosis. Prognostic factors and treatments.

4. Polyuria polydipsia syndrome: approach to diagnosis and treatment protocol.
5. Dog?s urinary tracts infections: Clinical manifestations. Diagnosis and treatment. Differe
6. Feline lower urinary tract disease (FLUTD): Forms, diagnosis, treatment and prevention. Fe
7. Urinary Incontinence: congenital and acquired forms. Differential diagnosis and treatment.
8. Surgery of the urinary system

Endocrinology and metabolic diseases (5 hours)

1. Disturbances posterior **hypothalamic-pituitary axis**. Canine diabetes insipidus. Diagnosis a
2. ***Adrenal cortex?s disorders****. Canine Hypoadrenocorticism and Hyperadrenocorticism. Diagnosi*
3. ***Disturbances of the thyroid and parathyroid glands****. Canine and feline hyperthyroidism hypo*
4. ***Pancreas endocrine disorders****. Canine and feline diabetes mellitus. Diabetic ketoacidosis.*
5. **Obesity.Primary and secondary obesity.Evaluation of body condition, treatment and preve**

Clinical Reproduction and obstetrics (12 h)

1. ***Dog and cat reproduction****. Selection and management of future males and breeding females fo*
2. **Male and female sterilization. Sterilization methods in non-breeding, canine and feline s**
3. ***Assisted reproduction****. Seminal collection, evaluation and processing for artificial insemi*
5. ***Male and female infertility****. Diagnosis, decision making, treatment options.*
6. **Gestation**. Pregnancy diagnosis in dog and cat. Recommendations during pregnancy. Noninfect
7. **Birth.Preparation and delivery care. Dystocia resolution. Programming a cesarean section.**
8. ***Dog and cat reproductive pathology****.Dog Pseudopregnancy, feline mammary hypertrophy, ovar*
9. ***Female genital tract surgery****. Ovarian, uterine and mammary tumors. Vaginal polyps. Episiot*
10. ***Male reproductive pathology.*** *Scrotum pathology, cryptorchidism, orchitis, epididymitis,*

Cardiology and Respiratory diseases (10 hours)

1. Disorders of the upper respiratory tract. Runny nose, sneezing and rales. Laryngitis, rhinitis, tracheal collapse: diagnosis, treatment. Brachycephalic dog syndrome.
2. Surgical management of obstructive lesions in nostrils, sinuses and upper respiratory tract. Surgical treatment of

brachiocephalic syndrome.

3. Bronchopulmonary diseases. Acute and chronic bronchitis. Acute and chronic pneumonias. Pleural effusions. Etiology, diagnosis, treatment and prevention. Parasitic bronchopneumonia
4. Pathology of pleural cavity: pneumothorax, chylothorax, diaphragmatic hernias. Pathology of the mediastinum. Diagnosis and treatment.
5. Pathological anatomy of the respiratory system

6 Heart rhythm disorders and cardiac impulse conduction: types, diagnosis, treatment. Prevention.

7. Congestive heart failure. Causes, diagnosis and treatment. Prevention. Cardiomyopathies.
8. Valvular heart disease: valvular endocardiosis, bacterial endocarditis. Pericardial disease. Types, causes, diagnosis and treatment.
9. Congenital cardiovascular diseases. Diagnosis and surgical treatment of the most common congenital malformations. 10- Pathological anatomy of the circulatory system.

Neurology (5 hours)

1. Diagnostic Approach to the neurological patient.
2. Convulsive syndrome. Symptoms, diagnosis and treatment.
3. Vestibular syndrome. Symptoms, diagnosis and treatment.
4. Meningoencephalitis and other disorders that affect the brain. Symptoms, diagnosis and treatment.
5. Ataxia and problems affecting the spinal cord. Symptoms, diagnosis and treatment.

6. Pathology of the peripheral nervous system and diseases of the neuromuscular junction and muscle. Symptoms, diagnosis and treatment.

7. Differential diagnosis of the more frequent injuries at necropsy of the central and peripheral nervous system. Pathogenetic mechanisms. Pathological anatomy of congenital malformations, degenerations, circulatory disorders and inflammation. Most common injuries in neuroendocrine ductless glands.

Behavioral (3 hours)

1.- Behavior problems in dogs and cats. Approach, diagnosis and treatment of canine and feline aggression.

2. Separation Anxiety fears and phobias in dogs and cats. Symptoms, diagnosis and treatment.

3. Inappropriate urination problems in dogs and cats. Approach, diagnosis and treatment.

Traumatology (7 hours)

1. Traumatology examination. Traumatic lameness vs. non-traumatic lameness.

2. Head fractures. Maxillary fracture. Palate fracture. Broken jaw. Paratrooper cat syndrome.

3. Traumatic lameness. Muscle, tendon and ligament injuries. Hip dislocation. Elbow dislocation. Fractures: treatment, decision making of fractures, fractures in young animals.

4. Non-traumatic lameness. Non-traumatic forelimb lameness: osteochondritis dissecans shoulder, elbow dysplasia, medial scapular humeral dislocation, bicipital tenosynovitis. Calcification supraspinatus tendon. Non-traumatic hindlimb lameness:

knee and hock OCD, hip dysplasia, Legg-Calvé-Perthes disease. Patellar luxation. Torn anterior cruciate knee ligament. Other non-traumatic lameness: panosteitis, osteoarthritis, bone tumors.

5. Spine. Herniated discs. Discospondylitis. Vertebral fractures and dislocations.

6. Differential diagnosis of the most common injuries in bone and muscle. Developing bone disease. Fibrous osteodystrophy. Hypertrophic osteopathy. Osteochondrosis. Chronic degenerative joint disease. Immune-mediated joint diseases. Biopsies and muscle diseases.

Hematology and Oncology (9 hours)

1.- General diagnostic procedures, therapeutic modalities and care of the cancer patient.

2. Soft tissue sarcomas of dog and cat. Neoplasms of fibrous origin; fibrohistiocytic; peripheral nerves; adipose tissue; muscle; vascular and lymphatic: Incidence and risk factors and disease, clinicopathological most relevant aspects, diagnosis, staging and treatment guidelines.

3. Skin Neoplasms. Neoplasms round cells: mastocytoma, histiocytoma, lymphosarcoma. Squamous cell carcinomas. Papillomas. Neoplasms of the hair follicle. Melanomas. Clinico-pathological most relevant aspects. Diagnosis, staging and treatment guidelines.

4. Neoplasms genital tract and breast. Ovarian, uterus and vagina neoplasms; testicles; breast. Clinico-pathological most relevant aspects. Diagnosis, staging and treatment guidelines.

5. Lymphoid Neoplasms. Lymphomas. Lymphoid leukemias. Plasma cell neoplasms. Clinico-pathological most relevant aspects. Diagnosis, staging and treatment guidelines.

6. Other neoplasms of importance in the dog and cat: Osteosarcomas, Gastrointestinal, Respiratory, endocrine, central nervous system and others. Clinico-pathological most relevant aspects. Diagnosis, staging and treatment guidelines.

7. Clinical evaluation of anemia (diagnosis and treatment). Clinical evaluation of erythrocytosis (diagnosis and treatment) . Hemostasis disorders: Clinical evaluation of thrombocytopenia. von Willebrand disease (could be removed). Hereditary and acquired coagulopathies. Clinical evaluation and treatment of disseminated intravascular coagulation (DIC). Systemic immune-mediated diseases.

8. Blood type and selection of a donor pacient. Transfusions. Methodology transfusion. Indications for the use of blood products. Spleen disease.

Infectious diseases (11 hours)

1. Feline Leukemia. Etiology, epidemiology. Pathogenesis and clinical summary. Diagnostic tests and interpretation. Prevention and control plans.

2. Feline immunodeficiency. Etiology, epidemiology. Pathogenesis and clinical summary. Diagnostic tests and interpretation. Prevention and control plans.

3. Feline infectious peritonitis. Etiology, epidemiology. Pathogenesis and clinical summary. Diagnostic tests and interpretation. Treatment, prevention and control plans

4. Canine distemper. Etiology Epidemiology. Pathogenesis and clinical summary. Diagnostic tests and interpretation. Prevention and control plans.

5. Rabies and pseudorabies. Etiology and epidemiology. Pathogenesis and clinical summary. Diagnostic tests and interpretation. Prevention and control plans.

6. Leptospirosis, brucellosis and other bacterial diseases of the dog and cat. Etiology and epidemiology. Pathogenesis and clinical summary. Diagnostic tests and interpretation. Prevention and control plans.

7. Intestinal dog-Virus (parvovirus, coronavirus, rotavirus) and cat (feline panleukopenia, coronavirus, rotavirus). Etiology, epidemiology and transmission. Pathogenesis and clinical summary. Plans diagnosis treatment, prevention and control.

8. Canine Infectious Hepatitis. Etiology and epidemiology. Pathogenesis and clinical summary. Diagnostic tests and interpretation. Prevention and control plans.

9. Canine infectious respiratory complex (parainfluenza, Bordetella, mycoplasma ..). Infectious canine tracheobronchitis. Etiology, epidemiology. Pathogenesis and clinical summary. Diagnosis. Plans treatment, prevention and control.

10. Feline infectious respiratory complex. Etiology, epidemiology (Includes: Feline calicivirus, feline herpesvirus, Chlamydophila felis). Pathogenesis and clinical summary. Diagnostic tests and interpretation. Plans treatment, prevention and control.

11. Systemic mycosis of dog and cat. Etiology and epidemiology. Pathogenesis and clinical summary. Diagnostic tests and interpretation. Prevention and control plans.

Parasitic diseases (9 hours)

1. Vector-borne parasitic diseases. Babesiosis and Theileriosis.

2. Parasitic diseases transmitted by vectors. canine visceral leishmaniasis. 3- Vector-borne parasitic diseases. canine and feline dirofilariasis.

4. Protozooses: Giardiardiosis and Coccidiosis.

5. Hemintosis roundworm: Ascarosis, Ancilostomosis, strongiloidosis.

6. Parasitic bronchopneumonia: Angiostrongylos and others.

Intensive take care and emergencies (8 hours)

1. General Approach canine and feline emergency. The A-B-C in emergencies. Initial assessment of the patient.

2. Approach to respiratory distress pacient. Diagnosis, evaluation, stabilization.

3. Approach to patients with acute abdomen. Differential diagnosis and treatment.

4. The intoxicate patient. Main poisoning in dogs and cats. Rodenticides. Insecticides. Ethyleneglycol. Others.

5. The traumatized patient. Outrages. paratroopers cats. Bites. Hunting accidents. Other trauma.

6. The hospitalized patient. Maintenance of the internal environment: diagnosis and treatment of acid-base, electrolyte water imbalances. Inpatient nutrition (enteral and parenteral). Assessment and treatment of pain in hospitalized patients. Surveillance and hospital care.

7. Guidelines anesthetic in dogs and cats. Analgesia in the dog and cat. Specifications in different patients (cardiac patients, epileptics, geriatrics, pediatrics, ..)

8. Euthanasia. Recognition of the need for euthanasia. Appropriate methods for performing euthanasia. Disposal methods of cadavers.

Course planning and calendar

Keys dates of this subject will be described in detail in the webpage (https://veterinaria.unizar.es/).

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28431

Universidad Zaragoza

Year : 2018/19

28432 - Aquatic animals and exotic pets Integrated Course

Syllabus Information

Academic Year: 2018/19

Subject: 28432 -Aquatic animals and exotic pets Integrated Course

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 4

Semester: Annual

Subject Type: Compulsory

General information

Aims of the course

The subject and its expected results respond to a single approach and goal: On one hand, the Graduate has to be able to respond to the needs and requirements of the Aquaculture sector both in its productive and sanitary management, being able to act also on those wild species closely linked to the natural environment and, on the other hand, learning about the main diseases affecting exotic animals (birds, reptiles and mammals), knowing how to apply an appropriate diagnostic, therapeutic and preventive protocol.

Context and importance of this course in the degree

The adaptation of the Spanish university qualifications to the EEES has forced to modify the structure, contents and methodologies of the curricula of the traditional veterinary degrees in our country. In the design of this new curriculum, it has been tried to give the Degree an approach based, fundamentally, on the competencies that the profession demands and the society needs of a titled and / or graduated in veterinary medicine. After an initial training where the students are acquiring a basic training that emphasizes in particular some general preclinical contents and / or basic productive and technological bases that must have a veterinary professional, they arrive at fourth grade, in which the subjects have been Organized jointly in subjects distributed by species following a completely new structure within veterinary studies, including aquatic and exotic organisms.

Aquaculture is one of the productive activities that has undergone greater evolution and technological growth during the last decades, due in large part to the need to seek solutions to the overexploitation of natural fishery

resources, and our country has not been unaware of this change. In this sense, the veterinary profession has played and must continue to play a preponderant and very active role in the search for new formulas that better improve, if possible, the level of production and health of aquaculture farms, adapting to the new regulations that regulate sustainability The sector and therefore the aquatic environment. For all this, the formation of future veterinarians also in this field acquires a special relevance.

The field of Clinical and Health of Exotic Animals requires the training provided by basic subjects such as Embryology and Anatomy I and II and Physiology and is closely linked to subjects of the same course as Integration of Companion Animals or Integration in Birds and Rabbits. Its bases are centred around the knowledge of medical pathology, reproductive pathology, surgical pathology, infectious and parasitic diseases and special pathological anatomy of the most important diseases for exotic animals. The knowledge in this field will be complemented with the clinical practice of exotic animals that all the students must realize in fifth course.

Recommendations to take this course

In order to facilitate the understanding of the different contents of the fields that integrate this subject, it is advisable that the student has acquired and passed the knowledge of some previous subjects related to biology, chemistry, anatomy, ethnology and animal welfare, parasitology, microbiology and immunology, physiology, pharmacology, general pathology and clinical propaedeutic, general pathological anatomy and reproduction.

Competences and learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Know the general and basic terminology of aquatic and exotic animals.
2. Analyse the different management systems of both productive and reproductive aquatic animas
3. Assess the possible impact of a fish farm and apply the current legislation.
4. Carry out methods and procedures of clinical exploration, an adequate sampling and to apply diagnostic techniques depending on the nature of the pathogenic agent and according to each clinical case.
5. Recognize and diagnose the most common diseases in aquatic and exotic animals.
6. Solve those problems related to the health management of an operation
7. Know and apply those legal and administrative provisions of the scope of these animal species.
8. Maintain an ethical and responsible behaviour in the exercise of the profession.
9. Solve problems and make decisions in the professional veterinary field.
10. Work in multidisciplinary teams and show respect, appreciation and sensitivity to the workmates

Learning outcomes

If students complete the course successfully, they should be able to:

AQUACULTURE

1. Know the general and basic terminology of the Aquaculture, as well as its history, evolution and current

trends at local and global level.

2. Knows the main production systems and the regulations that govern this activity.

3. Knows the facilities and the techniques of feeding, reproduction and improvement, of application in the Aquaculture.

4. Knows the impact this activity has on the environment and its legislation.

ICHTHYOPATHOLOGY

1. Know and understand the major pathological processes affecting aquatic animals.

2. Make a sampling according to the nature and characteristics of the disease establishing the most appropriate diagnostic tests.

3. Prescribe and apply the most appropriate treatments in each case.

4. Design and implement control and prevention programs according to the nature and the pathological process and the characteristics of the exploitation.

5. Know and apply the current legislation that regulates these species.

CLINICAL AND HEALTH OF EXOTIC ANIMALS

1. Know what an exotic animal is and know the legislation related to them.
2. Know the appropriate conditions of habitat and maintenance, as well as nutrition and reproduction
3. Know and understands the most frequent and important diseases that affect these animals.
4. Diagnose adequately the pathologies that affect them, taking samples and selecting the most appropriate diagnostic techniques for each case and interpreting the results.
5. Know and apply adequately the pharmacological and surgical treatment most appropriate to each pathology.
6. Know how to introduce preventive measures to prevent the emergence of the most important diseases

Importance of learning outcomes

Veterinary professionals trained in these disciplines will be able to contribute their comparative dimension, i.e. the ability to relate patterns of disease seen in fish populations in comparison with other animal populations and, on the other hand, the contribution of integrated knowledge, which arises from an epidemiological approach to the disease, which takes into account the factors that condition the presentation and evolution of these pathologies over time, elements that will allow the subsequent implementation of health management measures capable of providing solutions to the real needs of the aquaculture sector, improving the productivity and profitability of farms.

The content of the subject of Clinical and Exotic Animal Health is fundamental for the student to acquire the

knowledge and skills necessary to develop, in their professional life, clinical activities in the field of exotic animals, since this subject will address all aspects relating to the exploration and identification of symptoms of disease, application of diagnostic techniques, application of medical and surgical treatments and establishment of preventive measures.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Assessment activities

Written exam: The theoretical knowledge acquired in each of the subjects that make up this subject will be assessed jointly by means of a final written exam. This test will constitute 70% of the final grade and will include multiple-choice questions (of four alternatives , just one right answer and no negative score) and short answer questions distributed in three independent blocks, and weighted according to the number of credits in them. This test will take place on the dates indicated in the examination calendar drawn up and approved by the centre.

However, those students who so wish may take a partial written test (on the dates determined by the centre) of an eliminatory nature in the theoretical part of the subjects taught in the first four-month period and of the same characteristics described for the final test.

Practice sessions: Practical knowledge will be assessed through compulsory attendance control, interest and attitude and the delivery of reports of practices and teaching work and will constitute the remaining 30% of the final grade. Those students who have not attended or carried out these practices or have not reached the minimum grade to pass them may take a theoretical-practical examination of the contents taught in all the practices of the subject. This exam will take place on the same dates as the final written test.

Assessment criteria and requirement levels

The theoretical and practical rating for each of the subjects will be assessed on a total of 10 points, with the weighting factors 0,7 and 0,3 being applied respectively.

In order to pass the subject, it will be required that, on each of the four-month periods, the grade of both parts (theoretical and practical) be higher than 50% and the final grade of the subject be equally higher than 50%.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that has been designed for this subject is based on the following methodology:

Following the guidelines set by the ANECA, the Governing Council of the University of Zaragoza approved a presence of 50%, so that the 6 ECT credits allocated to this subject mean in practice 75 hours of student work, structured in participatory master classes, resolution and discussion of problems and clinical cases and practices in farms and teaching laboratories.

Learning tasks

For the learning of this subject, the student will perform different types of activities.

Participatory lectures. They include 9.5 h Aquaculture; 25.5 h of Ichthyopathology and 20 h of Clinic and Health of Exotic Animals.

Resolution and discussion of problems and clinical cases related to Ichthyopathology (two sessions of 2 hours each), which seeks to promote the capacity for analysis and decision making as close as possible to actual professional practice, including search for relevant information for this and placing special emphasis on the various ways of

resolution and justification of the decisions taken that in addition, will have to present their colleagues in public.

There will also be a session of two hours of resolution and discussion of problems and clinical cases related to exotic animals, with the same methodology and objectives indicated above for Ichthyopathology.

Practices in farms and teaching laboratories, in order that the student can achieve mastery of those skills and practical management essential in the acquisition of the corresponding professional competences. he IAAEx-1 practice (Clinical and exotic animal health), will be taught in farms where students will carry out the management, containment, exploration and sampling of different exotic species. Also note that the practices IAAEx-6 and IAAEx-8 corresponding to the ichthypathological matter will be sequential and therefore the contents will be entirely related.

In the matter of Aquaculture also includes a laboratory practice (IAAEx-3) aimed at the practical knowledge on the part of the students of the techniques related to the induced reproduction in fish species.

Syllabus

The program offered to the student to help him achieve the expected results includes the following activities ...

1: CLINICAL AND HEALTH PROGRAM IN EXOTIC PETS

Lectures (20 h)

I. Birds (Psittacidae and Passeriformes)

Unit 1: Anatomical and pathophysiological bases. Basic techniques in the bird clinic

Unit 2: Maintenance and nutritional pathologies.

Unit 3: Digestive pathologies and associated organs.

Unit 4: Respiratory and systemic pathologies.

Unit 5: Dermatological pathologies.

Unit 6: Reproductive and genitourinary pathologies.

Unit 7: Emergency, intensive care and surgery.

II. Reptiles (Chelonians, Lacertilians and Ophidians)

Unit 8: Anatomical and pathophysiological bases. Basic techniques in the reptile clinic.

Unit 9: Maintenance and nutritional pathologies.

Unit 10: Digestive pathologies and associated organs.

Unit 11: Respiratory and systemic pathologies.

Unit 12: Dermatological pathologies.

Unit 13: Reproductive and genito-urinary pathologies.

Unit 14: Emergency, intensive care and surgery.

III. Mammals (Rabbit, Rodents-Guinea Pig, Chinchilla, Hamster, Carnivores-Ferrets)

Unit 15: Maintenance and nutritional pathologies.

Unit 16: Digestive and respiratory diseases.

Unit 17: Reproductive, genito-urinary, dermatological and systemic pathologies.

Unit 18: Emergency, intensive care and surgery.

Seminar 1. CITES and legislation related to the transportation and possession of NACs.

Seminar 2. Zoonoses transmitted by the NAC (epidemiology and international legislation).

Practical sessions (5 h)

Practice IAAEx-1. Clinical exploration and sampling in birds and reptiles (3 h).

Practice IAAEx-2. Problem solving and clinical cases (2 h).

2: AQUACULTURE PROGRAM

Lectures (9,5 h)

Unit 1: Introduction to aquaculture. General concepts. Historical evolution, current situation and perspectives.

Unit 2: Water as a means of fish production. Management of aquatic resources. Study of parameters of water quality and minimum requirements.

Unit 3: Systems of production and management of continental species. Study of flow diagrams and development of facilities.

Unit 4: Systems of production and management of marine species. Study of flow diagrams and development of facilities.

Unit 5: General concepts. Study of raw materials. Nutritional requirements of fish species. Composition, formulation and manufacture of diets. Food behaviour and feeding management.

Unit 6: Reproductive Bases and Characteristics of the Reproductive Cycle of Fish. Gametogenesis. Endocrinology of the reproduction cycle. Gametes and fertilization. Control of reproduction: hormonal, by photoperiod, control of sex. Sterilization.

Unit 7: Environmental aspects derived from aquaculture. Main pollutant loads of effluents and establishment of corrective measures. Sustainable aquaculture.

Seminar 1. Production and economy. Socioeconomic aspects of aquaculture. Business base and economic management of aquaculture facilities.

Seminar 2. Reproductive and gametes management. Applied biotechnology in aquaculture breeding.

Practical Sessions (3 h)

Practice IAAEx-3. Sexual differentiation: Dissection, techniques of fertilization, sex change and triploidization.

3: PROGRAM IN ICHTHYOPATHOLOGY

Lectures (25.5 h)

I. Basic concepts

Unit 1: Environmental factors that influence the disease.

Unit 2: Anatomical and psysiopahological bases in ichthyopathology.

Unit 3: Fish immunology.

II. Abiotic disease factors affecting fish

Unit 4: Diseases due to alterations in water quality.

Unit 5: Nutritional diseases and developmental disorders (malformations).

III. Biotic disease factors affecting fish

Unit 6: Notifiable fish diseases. Viral haemorrhagic septicaemia and infectious hematopoietic necrosis.

Unit 7: Infectious salmon anemia, infectious pancreatic necrosis and salmonid alphavirus.

Unit 8: Infection with koi herpesvirus and spring viraemia of carp.

Unit 9: Lymphocystis and nodavirus diseases.

Unit 10: Furunculosis and other diseases caused by Aeromonas.

Unit 11: Streptococcosis and bacterial kidney disease.

Unit 12: Myxobacterioses and red mouth disease.

Unit 13: Vibriosis and pasteurellosis.

Unit 14: Saprolegniasis and icthyophoniasis.

Unit 15: Ectoprotozoosis in fish.

Unit 16: Ecto helminthiasis in fish

Unit 17: Arthropod, leech and glochidial infestation

Unit 18: Endoprotozoosis (Flagellates and coccidiosis).

Unit 19: Microsporidiosis.

Unit 20: Myxozoan infections.

Unit 21: Endo helminthiasis.

Unit 22: Fish borne helminthic zoonoses.

IV. Biotic factors of disease affecting molluscs.

Unit 23: Protozoan parasites of bivalve molluscs I: Bonamiosis and Mikrocytosis.

Unit 24: Protozoan parasites of bivalve molluscs II: Marteiliosis and Perkinsosis.

V. Biotic factors of disease affecting crustaceans.

Unit 25: Notifiable shellfish diseases. White spot disease. Afanomicosis of the native crayfish.

Practical sessions (12 h)

Practice IAAEx-4. Problem solving and cases I (2 h).

Practice IAAEx-5. Problem solving and cases II (2 h).

Practice IAAEx-6. Ichthyopathological study I (4 h).

Practice IAAEx-7. Ichthyopathological study II (2 h)

Practice IAAEx-8. Interpretation of results of the Ichthyopathological diagnosis (2 h).

Course planning and calendar

The dates and key landmarks of the subject are described in detail, along with those of the other subjects of the fourth year in the Degree of Veterinary, in the Web page of the Faculty of Veterinary Medicine (https://veterinaria.unizar.es/academico / Veterinary-grade-study plan). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28432

Universidad Zaragoza

Year : 2018/19

28433 - Equine Integrated Course

Syllabus Information

Academic Year: 2018/19

Subject: 28433 - Equine Integrated Course

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 7.0

Year: 4

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The goal of the course is to provide students an adequate level of theoretical and practical knowledge of production, clinical and equine health that will serve as a starting point for further professional development.

In order to achieve this general goal, the **specific aims** of this course are to:

1. Know the essential guidelines of a correct nutritional management.
2. Know the different systems of breeding of saddle horses in its different components and the main guidelines of handling of the horses.
3. Know the objectives and criteria of the equine selection schemes.
4. Know the infectious and parasitic processes that affect equids.
5. Recognize the main lesions that the different pathologies originate in the equids.
6. Know the diagnosis, treatment and prognosis of the main pathologies of the equids.
7. Understand and apply assisted reproduction techniques in stallions and mares.
8. Identify and solve the processes that affect the gestational period, the birth and puerperium as well as the associated pathologies of the mare and foal.

Context and importance of this course in the degree

In the first years of the degree, the student studies subjects related to basic sciences that a veterinarian has to know, as well as subjects that deal with the form and function of animals, general preclinical contents and the fundamental productive and technological bases.

After this initial training, the student reaches the fourth year of the degree, in which the subjects have been organized into subjects by species.

As a consequence of this structure, many of the traditional subjects disappear such as: Infectious Diseases, Parasitic Diseases, Animal Production, Nutrition, Quantitative or Special Genetics, Special Pathology, Medical Pathology, Surgical Pathology, Pharmacotherapy and Reproduction and Obstetrics. These ten subjects have been present as subjects of their own (with identical or similar denominations) in practically all Spanish veterinary curriculum since the 1970s.

The aim of this structure is to ensure that undergraduate students acquire the necessary skills to be able to efficiently develop the professional activities that society entrusts to veterinarians. In this professional reality of the veterinarian the knowledge of the different subjects are used and applied in an integrated way in the different fields of action, which are usually determined by the animal species around which the veterinarian develops his work.

As a result of this, in the fourth year these traditional subjects have been incorporated into six different subjects that, organized by species, integrate the different contents that were previously divided into a dozen subjects. These new subjects are integration in ruminants, small animals, pigs, equids, birds and rabbits and exotic animals and fish.

The course will focus mainly on basic aspects of production, clinical and health of saddle horses.

In the last decades,the socioeconomic development of our country and those of our environment has led to horse to evolve from being exclusively a working tool and a source of animal protein to become the main element of many sporting and recreational activities, which generates significant economic activity in developed countries, often linked to close emotional ties between equines and their owners and carers. This reality makes our society demand specialized services from the professional veterinarian, which need a solid initial base, at grade level, in the productive, clinical and sanitary aspects related to this species, allowing graduates to continue, if necessary, with the increasingly necessary postgraduate specialization.

Therefore, one of the subjects of this fourth year is the equine integrated course, which aims that the student acquires, from an integrative vision, an adequate level of competence and ability in production, clinical and equine health. The course consists of 7 ECTS credits that respond to the relative importance of the number of graduates who exercise their profession around this species, which is, for census and livestock reasons, much lower than that of veterinarians dedicated to other pets or slaughter animals.

The subject, since there are numerous pathologies, production processes, clinical techniques and very similar health problems among the different species distributed in other subjects of the same course, will have contents related to:

- Integration in pets (e.g. in the diagnosis and medical or surgical treatment of many similar processes in specialities such as ophthalmology, neurology, dermatology, cardiology, fluid therapy, intensive care, anaesthesiology, etc.).
- Integration in ruminants (e.g. in relation to some forage production and feeding patterns - due to the herbivorous condition of horses - as well as to selection mechanisms and schemes; but also in many clinical procedures and techniques, especially due to the similar size of equids and cattle, and even in diseases produced by very similar infectious and parasitic agents, how to prevent them, how to diagnose them, their lesions...).

In the fifth year, the degree includes practicum-like subjects in which more clinical aspects can be practiced (Clinical Practicum in Small Animals, Exotics and Equids), post-mortem diagnosis (block of post-mortem diagnosis of the Practicum of food animals), health interest and public health related to the species (Zoonoses, Preventive Medicine and Health Policy), as well as food safety (Hygiene, Inspection and Food Control), since we cannot forget that some equids are also produced and destined for human consumption.

Recommendations to take this course

It is recommended that the student has previously acquired the competences acquired in the following subjects:

- Agronomy
- General Pathological Anatomy
- Diagnostic Imaging
- Embryology and Anatomy I and II
- Epidemiology and biostatistics
- Ethnology and animal welfare
- Pharmacology and Drug Therapy
- Animal physiology
- Genetics
- Microbiology and Immunology
- Animal Nutrition
- Parasitology
- General Pathology and Propaedeutics I and II
- General surgical pathology, surgery and anesthesiology
- Reproduction and Obstetrics
- Toxicology

Competences and Learning outcomes

Competences

Student´s competencies after completing the course:

1. The basics of equine breeding and the basics of equestrian facilities and environmental hygiene
2. Raw materials for horse feeding and the basis of equine nutrition and ration formulation.
3. Genetic applications to improvement and health programs
4. Methods and procedures for clinical examination in equines, diagnostic and complementary techniques and their interpretation.
5. The clinical study of the sick horse and the medical, surgical or hygienic-dietary treatments required, as well as sporadic diseases affecting groups of horses.
6. Sedation, anaesthesia and equine resuscitation and surgical techniques used in horses
7. Reproductive strategies and procedures, foaling and puerperium in the equine species, necessary care and frequent alterations. Care and diseases of newborn foals.
8. The main infectious, parasitic, medical and surgical processes affecting equids and applying knowledge and skills to real contexts.
9. Technical measures and regulations for the prevention, control and eradication of equine diseases.
10. The technique of necropsy of equidae and the recognition and diagnosis of the different types of lesions and their association with pathological processes.
11. Basic knowledge of a second language, especially in technical aspects related to production, clinical and equine health.

Learning outcomes

If students complete the course successfully, they should be able to:

1. Know the main nutritional requirements of the horse in its different productive and physiological states and that he is capable of analyzing and elaborating a basic food ration and of explaining and recommending the essential guidelines of a correct nutritional management.
2. Know the different systems of breeding of saddle horses in their different components, as well as the main equestrian disciplines and uses of the horse and that he understands the characteristics and dimensions of the facilities habitually used in the equine industry and the main guidelines of handling of the horses and the consequences derived from the errors of handling.
3. Understand the objectives and selection criteria in the equine selection schemes in Spain, their genetic parameters and genetic evaluation models.
4. Apply the basic protocols of physical restraint, tranquilization, sedation, anesthesia, monitoring and pain management in horses.
5. Know and recognize the main infectious and parasitic processes affecting equids and perform differential diagnosis with other diseases. The student must also demonstrate that he knows the different diagnostic tests that allow the identification of the causal agent and that he has acquired the necessary skills to perform some of them, as well as to apply the therapeutic protocols and the appropriate strategies for the prevention, control and/or eradication of infectious and parasitic processes.
6. Apply the standard necropsy technique in the equine species, which knows and recognizes the main lesions in these species, which knows how to explain the pathogenesis of the detected lesions, and which can orient towards possible etiological diagnoses and their differentials from the observed lesions.
7. Know and understand the symptomatology, etiology, pathogenesis, predisposing factors, differential diagnosis, basic diagnostic aids, essential treatments and the prognosis of the main pathologies that affect the different apparatuses and organic systems of the adult horse and knows how to use the related terminology.
8. Include the characteristics and reproductive control of equids and applies reproductive biotechnologies.
9. Knows the mechanisms involved in foaling, their control and the techniques that favor it, as well as the medical and surgical treatments application in obstetric and reproductive processes
10. Understand the physiological differences between neonates and adult horses and knows and understands the symptomatology, etiology, pathogenesis, predisposing factors, differential diagnosis, basic diagnostic aids, essential treatments and the prognosis of the main diseases that affect the different apparatuses and organic systems of foals and neonates and knows how to use related terminology.

Importance of learning goals

They allow students to acquire an adequate level of theoretical and practical knowledge of breeding, clinical and equine health that will serve as a starting point for your subsequent professional development.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Theory sessions will be assessed by means of written exams which may consist of a combination of multiple choice, short answer and medium development questions. The grade for this test is 75% of the final grade.

The examination of the theoretical contents will be the following ones:

- **Assessment:** the first midterm exam
- **Assessment:** the second midterm exam

The weight of each of these tests in 75% of the final grade corresponding to the theoretical part, will be weighted according to the extent of the thematic blocks included in each test.

In order to pass these theoretical tests it will be necessary to reach at least 50% of the maximum score of the exam. Passing these tests will accredit the achievement of the theoretical component of learning outcomes 1 to 9. Assessment tests 1 and 2 will take place on the dates indicated in the examination schedule drawn up by the centre. The midterm exam grades are saved for sessions of the same academic year.

Assessment of the knowledge and practical skills

Assessment 3: The grade of this exam is 25% of the global grade, but it will be only counted if the two theory midterm exams have been passed separately. Passing these tests will accredit the achievement of the practical part of the learning outcomes 1 to 9. It breaks down in three parts

Part 1: Making the most of the practical sessions: At the end of each practice, the teacher will verify that the student has passed the objectives of the practice. The continuous assessment of the performance in the practical sessions will suppose 10% of the final grade of the subject.

Part 2: Written examination of practical knowledge given in practical sessions attended by all groups only in the first midterm exam. Only students who have attended more than 75% of the practical sessions of the first midterm exam (in the same academic year or in previous years) may take this test. It will be held on the same day of the **Assessment 1.** No minimum grade is required to pass this part.

Part 3: Written exam of practical skills taught in practical sessions attended by all groups only during the second midterm exam throughout the course (excluding sessions attended by all groups in the first part). Only students who have attended more than 75% of the practical sessions of the second midterm exam (in the same academic year or in previous years) may take this test. It will be held on the same day of the **Assessment 2**.

Parts 2 and 3 may combine multiple-choice, short answer and mid-development questions, documented questions with multimedia files, and case and problem solving.

Students who do not attend 75% of the scheduled practical sessions will be required to take a practical test, which may include demonstrations of animal, biomodel, or specimen skills, as well as written questions, which may combine multiple-choice, short-answer, and mid-development questions, questions documented with multimedia files, and case and problem solving.

The grade of the practical part shall be saved for future sessions

Global assessment

In June and September sessions, students will be able to take **Assessments 1** and **2** as well as **Part 1** and **2** of the **Assessment 3** if they have attended at least 75% of the practices.

Students who have not attended at least 75% of the scheduled practical activities should take a practical exam, which may include demonstrations of skills on animals, biomodels or specimens, as well as written questions, which may combine multiple-choice, short answer and mid-development questions, questions documented with multimedia files, and case and problem solving.

Evaluation criteria and requirement levels

In the different assessment tests the theoretical and practical knowledge, skills and transversal competences included in this subject will be evaluated. In the multiple-choice questions of the written examinations incorrect answers will be

penalized with the value of the question divided by the number of wrong options.

Methodology, learning tasks, syllabus and resources Methodological overview

The learning process designed for this topic is based on lectures, demonstrations and laboratory sessions, problem and case-based learning sessions, on-line multimedia material and autonomous work. No minimum grade is required to pass this part.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Learning tasks

The activities are detailed in the following table

Learning Task	Face to face hours	FACTOR	Off-site hours	TOTAL
Theory lectures	60	0.83	50	110
Practices and wet-lab sessions	27.5	0.54	15	42.5
Multimedia			11	11
Tutorials			6.5	6.5
Exams	No		5	5
Total	87.5	1	87.5	175

Syllabus

LECTURES:60 hours

MODULE 1 (5 h)

- Topic 1: General overview of management, uses, facilities and official documentation of horses (1)
- Topic 2: Equine nutrition (2)
- Topic 3: Breeding in saddle and sport horses (1)
- Topic 4: Sedation and anesthesia in horses (1)

MODULE 2: GASTROINTESTINAL TRACT (12 h)

- Topic 5: Oral cavity (1)
- Topic 6: Parasitic diseases with particular impact in the digestive tract (including dyctocaulosis) (2)
- Topic 7: Diseases of the gastrointestinal tract without acute colic symptomatology: EGUS, esophageal choke, inflammatory bowel disease and malabsorption, chronic diarrhoea (1)
- Topic 8: Colic syndrome: classification and clinical exploration. Importance of endotoxemia in equine clinic (2)
- Topic 9: Fluid therapy and medical treatments of colic (1)
- Topic 10: Decision making, principles of colic surgery and postoperative complications (1)
- Topic 11: Diseases that cause colic in stomach, small intestine and cecum
- Topic 12: Diseases that cause colic in large colon (including acute colitis) (1)
- Topic 13: Diseases that cause colic in small colon. Other clinical processes: rectal lacerations and prolapse, peritonitis and abdominal herniation (1)

- Topic 14: Acute and chronic diarrhoea. Inflammatory bowel disease and malabsorption (including pathology) (1)

MODULE 3: OTHER ORGANIC SYSTEMS AND APPARATUS (13 h)

- Topic 15: Main cardiac arrhythmias and heart murmurs (1)
- Topic 16: Main urinary diseases: bladder stones, acute and chronic renal insufficiency (1)
- Topic 17: Endocrine, metabolic and liver diseases (1)
- Topic 18: Main diseases in equine ophthalmology (1)
- Topic 19: Main non-infectious or parasitic neurological diseases (1)
- Topic 20: Neurological infectious diseases (2)
- Topic 21: Neurological parasitic diseases. Systemic and notifiable parasitic diseases (1)
- Topic 22: Systemic and notifiable infectious diseases (2)
- Topic 23: Dermatology: skin neoplasms, processes of allergic origin (1)
- Topic 24: Dermatology: processes of parasitic and infectious ethiology (1)
- Topic 25: Gross pathology of module 5 (1)

MODULE 4: RESPIRATORY TRACT (7 h)

- Topic 26: Upper respiratory tract: nasal cavity, sinus, pharynx, larynx, guttural pouches and trachea (2)
- Topic 27: Lower respiratory tract: not-infectontagious diseases. Pneumonia. Conditions of the pleural cavity and chest wall, pleuropneumonia (2)
- Topic 28: Bacterial respiratory diseases (1)
- Topic 29: Viric respiratory diseases (1)
- Topic 30: Gross pathology of respiratory tract (1)

MODULE 5: LAMENESSES (10 h)

- Topic 31: Semiology and diagnosis. Diagnostic regional and intrasinovial blocks (1)
- Topic 32: Hoof care. Principles of normal and therapeutic shoeing (0'5)
- Topic 33: Laminitis (1'5)
- Topic 34: Injuries of the hoof (1)
- Topic 35: Bone diseases (1)
- Topic 36: Wound management, orthopedic emergencies and bandages (1)
- Topic 37: Osteoarthritis (Degenerative Joint Disease) (1)
- Topic 38: Podothroclear syndrome and caudal hoof pain (1)
- Topic 39: Tendon and ligament injuries (1)
- Topic 40: Muscular diseases and myopathies. Causes of back pain (1)

MODULE 6: REPRODUCTION. STUD FARM DISEASES (8 h)

- Topic 41: Exploration of the mare (including uterine biopsies and cytology) and estrous cycle control) (1)
- Topic 42: Stallion exploration. Semen extraction, evaluation and conservation (1)
- Topic 43: Mare and stallion infertility (1)
- Topic 44: Natural breeding, artificial insemination and embryo transfer (1)
- Topic 45: Infectious and parasitic diseases of reproductive tract and sexual transmission, including infectious abortions (1)
- Topic 46: Management of gestation. Problems during pregnancy and non-infectious abortions (1)
- Topic 47: Partum induction, dystocia, caesarean-section and puerperal problems (1)
- Topic 48: Stallion and mare urogenital surgery (sudden procedures) (1)

MODULE 7: NEONATOLOGY AND COLTS (5 h)

- Topic 49: Birth: fetal viability, neonatal resuscitation, adaptation of extra-uterine life. The sound foal. Sick newborn warning signs. Neonatal hypoxic-ischemic encephalopathy (1)

- Topic 50: Failure of passive immunity transfer. Neonatal sepsis. Neonatal isoeritrolisis. (1)

- Topic 51: Other common diseases of the newborn foal and colts: umbilical and scrotal hernias, umbilical stump and bladder disorders, septic arthritis/polyarthritis (1)

- Topic 52: Developmental Orthopedic Diseases, (1)

- Topic 53: Gross pathology of modules 6 and 7(1)

PRACTICAL SESSIONS: 27,5 face-to-face workshop hours

- Session 1: Preparation of rations (2 hours) (12 groups) Computer room

- Session 2: Qualitative and quantitative coprology of parasitic processes. Parasitological post-mortem diagnostic (2 hours) (12 groups) Laboratory of Parasitology.

- Session 3: Lameness examination: inspection and static exam with lame horses (1.5 hours) (24 groups) HVUZ.

- Session 4: Lameness examination: dynamic exam with lame horses and/or and/or Computerized Lameness Simulator

(1.5 hours). (24 groups) HVUZ and/or Computer room.

- Session 5 Peri-neural anesthesia and arthrocentesis of the distal limb of the horse, dissection of the distal limb (3 hours) (24 groups) Wet lab with postmortem specimens in Surgical lab.

- Session 6: Case-based learning session: SOS: my horse is in colic! (2 hours) (12 groups)

- Session 7: Case-based learning session: My horse show respiratory noises...! My horse coughing with/without nasal discharge...! (2 hours) (12 groups)

- Sessions 8 and 9: Genital exploration of the mare. Evaluation and preparation of seminal doses (3.5 hours) (24 groups). Teaching farm-ship with mares and Biotechnology lab

- Session 10: Case-based learning session: Infertile mare.!. Danger: abortions...! (2 hours) (12 groups)

- Session 11: Case-based learning session: My newborn foal is ill...! (2 hours) (12 groups)

- Session 12: Problem-based learning session: I just bought a horse...! (2 hours) (12 groups)

- Session 13: Necropsy technique in horses: visualization of the equine digestive tract and other internal organs (2 hours) (6 groups) Necropsy room.

- Session 14: Advanced clinical examination - Pre-purchase examination (2 hours). (24 groups) Teaching farm-ship with horses

MULTIMEDIA FILES SELF-STUDY: 11 hours of autonomous work

Students must watch (individually or in a group) the following multimedia files. These activities must be carried out before the respective theoretical lectures.

- Video: The horse digestive system, Horse digestion guide Equine Nutrition Feedstuffs y The horse body condition (1 hour) (before Topic 2)

- CD Equine Dental (before Topic 5) (1 hour)

- CD Passing a nasogastric tube in the horse (before Topic 7) (1 hour)

- DVD Equine Colic (before Topic 8) (2 hours)

- CD Cardiac sounds (before Topic 15 (1 hour)

- CD Equad: upper respiratory tract (before Topic 26) (1'5 hours)

- CD Reproductive ultrasound in mares (before Topic 41) (0'5 hours)

- CD Foal in Mare (before Topic 47) (1 hour)

- CD Fetal and maternal dystocia in the mare (before Topic 47) (1 hour)

- Video: Urogenital surgeries in the horse (before Topic 48) (1 hour

Course planning and calendar

The key dates and milestones of the course are described in detail, along with those of the rest of the subjects of the third year in the Veterinary Degree, on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradoveterinaria/). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28433

Universidad Zaragoza

Year : 2018/19

28434 – Porcine Integrated course

Syllabus Information

Academic Year: 2018/19

Subject: 28434 – Porcine Integrated Course

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 8.0

Year: 4

Semester: annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The general goal of this course is the basic learning of the structural conditions of pig production, the strategies of feeding and management, the technology of reproduction and the diagnosis of pig diseases.

In order to achieve this general and the specific learning goals of this subject, will be set to ensure that the student is able to:

- Know the Spanish pig production chain. (Stocks or numbers of animals) and production structure. Markets and price formation.
- Know the technical bases of pig production. Knowledge of the environmental requirements of the species. Intensive and extensive production systems. Production by phases.
- Knowledge of the design of facilities and equipment in intensive and extensive pig farms. Environmental control. Batch handling and sizing.
- Know the reproductive planning and of the daily handling in the different productive phases.
- Know the final product. Characteristics and commercial types.
- Formulate diets for pigs in different productive phases and production conditions taking into account the practical criteria of feeding management, and relate the quality of the diet with the expected yields
- Know the characteristics that form part of the objectives and selection criteria in pigs, to interpret the results of the genetic evaluation of reproducers and to evaluate the application of molecular genetics in Swine Breeding.
- Understand the reproductive characteristics of the male and female in the porcine species, to plan and to carry out its reproductive control, to apply the biotechnology of the reproduction and the obstetric techniques.
- Know the symptoms and lesions characteristic of the main pathological processes of pigs.
- Know the different pathological agents that cause swine diseases and relate them to the symptoms and lesions they cause.
- Know the epidemiology and pathogenesis of the main pathological processes of pigs.
- Know the different laboratory tests available and to know how to choose, take and send the appropriate samples for the etiological diagnosis.
- Know the therapeutic and/or preventive possibilities that can be used against the different diseases.
- -Be able to follow a control plan of the main swine diseases.
- Know how to diagnose and treat the reproductive pathology of female and male pigs, including the basic

techniques of anaesthesia and surgery applied to reproduction.

Context and importance of this course in the degree

It is a fourth year subject, so students need all the knowledge acquired in subjects such as Anatomy, Physiology, Microbiology and Immunology, General and Propaedeutic Pathology, Reproduction, Parasitology and Imaging Diagnosis over the previous years. Its bases focus on knowledge of special pathological anatomy, infectious and parasitic diseases of pigs, diseases of the reproductive system and their control. The knowledge acquired during this course will be completed with the practicum that all students must complete in the fifth year.

Recommendations to take this course

It is recommended that the student has studied the subjects of the previous courses and has especially approved the subjects of Anatomy, Physiology, Microbiology and Immunology, Genetics, Nutrition, Ethnology and Ethology, General Pathology and Propaedeutics, Reproduction, Parasitology and Diagnostic Imaging, as a solid knowledge of these subjects is required to successfully address this subject of integration.

On the other hand, it is considered of utmost importance that the student actively participates in all the practical face-to-face sessions.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Identify and evaluate the different aspects that influence and condition pig production in order to make the appropriate decisions.
- Design, interpret and evaluate a management by lots or bands in a pig farm, as well as the dimensioning of the farm and its adaptation to the different aspects that define biosecurity in pig facilities.
- Design and properly evaluate the facilities and equipment in intensive and extensive pig farms, as well as their adaptation to the different national and international welfare regulations, both current and future.
- Evaluate the suitability of the different environmental control systems present in pig farms and to identify possible problems as well as to propose the corresponding corrective measures.
- Establish and apply the criteria of waste as well as selection and breeding of replenishment in breeding farms.
- Apply the appropriate management guidelines in the different productive phases, both in the maternity ward (sows and piglets) and in gestation and in growth and fattening.
- Manage the management of the waste generated in the pig farm.
- Develop the technical and economic management of a pig farm and to adapt it to price fluctuations and changing market demands.
- Assess the quality of the carcass and the meat in the different commercial types present in the market. Recognise the characters that form part of the selection criteria and objectives in a pig improvement scheme.
- Get integrated as a technician in a pig production company to be integrated as a technician in a pig selection company.
- Know how to advise the productive sector in questions related to genetic improvement.
- Establish and modify practical feeding guidelines for breeders and growth animals, including the presentation of the feed and the raw materials used, as well as their limitations of use.
- Advise the productive sector on the principles of pig feeding in its different productive phases. Analyze, synthesize and solve problems, and make decisions.
- Flexibility to work effectively in uni or multi-disciplinary teams.
- Know how to look for and manage information related to professional activity.
- Know how to communicate the information obtained in professional practice to other colleagues, public or private bodies and the general public.
- Knowledge of objectives and selection criteria. Interpreting the results of the genetic evaluation and assessing the possibilities offered by molecular genetics in the genetic improvement of pigs.
- Schedule and carry out the reproductive control in the porcine species and to know the pathological

consequences of an inadequate handling.

- Apply reproductive biotechnology and obstetric techniques in the porcine species.
- Identify and correctly name clinical signs and lesions, being able to associate them with specific pathological processes, making simple differential diagnoses based on these data.
- Write reports in a clear and concise way with the clinical history and the observed pathological findings.
- Take the appropriate samples and send them correctly, accompanied by a report, requesting the most suitable laboratory tests for the confirmation of reliable etiological diagnoses.
- Establish therapeutic measures based on scientific criteria. Establish and apply preventive and disease control programmes.
- Diagnose and treat the reproductive pathology of the female and male pigs, including the basic techniques of anaesthesia and surgery.

Learning outcomes

If students complete the course successfully, they should be able to:

- Get to know the Spanish pig production chain. Census and production structure. Markets and price formation.
- Get to know the technical bases of pig production. Knowledge of the environmental requirements of the species. Intensive and extensive production systems. Production by phases.
- Knowledge of the design of facilities and equipment in intensive and extensive pig farms. Environmental control. Batch handling and sizing.
- Knows the reproductive planning and the daily management in the different productive phases. Knows the final product. Characteristics and commercial types
- Formulate diets for pigs in different productive phases and production conditions taking into account the practical criteria of feeding management, and relate the quality of the diet with the expected yields.
- Know the characteristics that are part of the objectives and selection criteria in pigs, interpret the results of genetic evaluation of breeders and assess the application of molecular genetics in Swine Breeding.
- Include the reproductive characteristics of the male and female in the porcine species, to plan and carry out its reproductive control, to apply the biotechnology of reproduction, the obstetric techniques and the care of the newborn.
- Know the symptoms and lesions characteristic of the main pathological processes of pigs.
- Know the different pathological agents that cause swine diseases and relates them to the symptoms and injuries they cause.
- Know the epidemiology and pathogenesis of the main pathological processes of pigs.
- Knows the different laboratory tests available and know how to choose, take and send the appropriate samples for the etiological diagnosis.
- Knows the therapeutic and/or preventive possibilities that can be used against the different diseases. Is able to follow a control plan of the main swine diseases.
- It knows how to diagnose and treat the reproductive pathology of female and male pigs, including the basic techniques of anaesthesia and surgery applied to reproduction.

Importance of learning goals

The content of this course is essential for the student to acquire the knowledge and skills necessary to develop, in their professional life, activities in the pig sector, since this course will address all aspects relating to knowledge of the structure of the pig sector, practical feeding including the formulation of rations and the management of the different production phases as well as the most common facilities and equipment affecting the organization and criteria of biosafety. The application of diagnostic techniques, identification of syndromes, application of medical and surgical treatments, establishment of preventive measures, elaboration of reports, etc. will also be addressed. In other words, the subject systematically brings together the most important knowledge about clinical and pig production.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Assessment activities

1. The final **theoretical examination** will consist of both short answer and multiple choice questions. The latter will consist of several statements that must be qualified as true or false by the student. Each incorrectly answered statement annuls another correct one, so that if a negative value were obtained in a question, it would subtract it from the sum of the grades of the right answers. The theoretical exam is 80% of the final grade. The student will have to pass it (5 out of 10 at least) so that the other aspects of the final evaluation (work) can be considered.

2. In the **practice sessions**, it will be compulsory to attend at least 80% of the sessions. The passing of the practical activity will be valid for all the calls that the student needs to pass the subject. If 80% of the practical sessions have not been completed, the student may take an examination of the practices not completed in order to demonstrate the acquisition of the corresponding skills.

3. Likewise, the student will have to **draw up an assignment** of any aspect related to the health and porcine production, that will suppose the 20% of the final mark. Failure to present the work in a call will result in a grade of "0" in the same, so that the student must obtain a grade of at least 6.3 in the theoretical examination to pass the subject. The individual work will be valid for all the calls that the student needs to pass the subject.

Regarding the assessment of the essay:

Positive rating	Negative rating
Understanding laws, theories and concepts	Lack of explanations in the development of the problems
Skill and ability in the handling of mathematical tools	Messy and unproper presentation
The correct use of magnitude units	Mistakes in simple mathematical calculations
Clarity in schemes, figures and graphical representations	Spelling mistakes
Proper approach and results, as well as their order, presentation and interpretation.	

The global assessment will consist of a written part consisting of short answer and multiple-choice questions that represent 80% of the final mark. To this mark it will be added the score for the quality of the work presented, (equivalent to 20% of the final grade.)

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

Learning process designed for this particular subject (Integration in Pigs) is based on lectures, practical training and autonomous work.

Sixty six lectures will be given in the classroom assigned by the establishment. Students of the subject will be divided into two groups.

Thirty-four hours of practical training will be offered in different locations: experimental farm of the Veterinary Faculty, commercial farms, necropsy room, labs of different departments (infectious diseases, parasitology, reproduction) and computer room

Every student must perform an individual work about a particular aspect of pig health and production. Such individual work must be delivered to the teachers not later than May 30 (June call) or before the September examination.

Learning tasks

The programme that is offered to the student to help him/her achieve the expected results includes the following activities posted below

Syllabus

LECTURE SCHEDULE

Sixty eight lectures of 50 minutes time each of them:

Lesson 1. PIGMEAT SECTOR STRUCTURE (1). World, European and national relevance of the pig meat farming and industry. Pork foreign trade. Pork consumption. Main production indexes. Main reproductive indicators: litter size, piglets weaned, number of farrowings per sow and year...

Lesson 2. PIGMEAT SECTOR STRUCTURE (2). Organization and spread of the genetic improvement. Selection, multiplication and production farms. Business organization. Types of integration. Farm size. Forecast for future structures.

Lesson 3. ECONOMIC ASSESSMENT OF PIG FARMS. Economic indicators. Fixed and variable costs. Production costs of several products: weaned piglet, 2-months piglet and finished pig.

Lesson 4. BIOSECURITY IN PIG FARMS. How a disease can be introduced in pig farms. Biological isolation. Animal intake and movement controls. Biosecurity actions. Cleaning and disinfection. Insemination centers biosecurity.

Lesson 5. WASTE MANAGEMENT IN PIG FARMS. Rules. Slurry management. Animal carcasses management. Gas emissions.

Lesson 6. SELECTION CRITERIA IN PIG GENETIC IMPROVEMENT. Pig genetic characters of interest. Heredability and genetic and environmental correlations. Economic value of the different characters.

Lesson 7. PIG IMPROVEMENT STRATEGIES. Selection, crossing and heterosis. Control of blood relationship.

Lesson 8. GENETIC IMPROVEMENT OF THE MATERNAL LINES. Genetic basis. Genetic improvement of reproductive traits. Genetic improvement of survival and longevity. Genetic management. Genetic evaluations assessment.

Lesson 9. GENETIC IMPROVEMENTOF THE PATERNAL LINES. Genetic basis. Genetic improvement of production and carcass traits. Genetic improvement of meat quality. Genetic management. Genetic evaluations assessment

Lesson 10. GENETIC BIOTECHNOLOGY. Genes of interest in porcine genetic improvement. Genome improvement. Other biotechnological applications of genetics in pigs.

Lesson 11. PRIMIPAROUS SOWS. Puberty. Sexual cycle. Pregnancy. Farrowing. Lactation and weaning. MULTIPAROUS SOWS.

Lesson 12. THE BOAR. Puberty. Hormonal cycle. Spermatogenesis. Training and semen recovery procedures.

Lesson 13. REPRODUCTIVE CONTROL IN PIGS. Management and hormonal techniques. Pathological consequences of an incorrect control.

Lesson 14. REPRODUCTIVE BIOTECHNOLOGY. Semen recovery and evaluation. Semen preservation. Heat

detection. Mating. AI. Pregnancy diagnosis. FIV techniques. Embryo transfer.

Lesson 15. FARROWING. Types of farrowing. Obstetric care techniques in sows.

Lesson 16. THE NEWBORN PIGLET. Farrowing care. Newborn pathology: Congenital abnormalities, weakness, iron deficiency anaemia...

Lesson 17. PIG HOUSING. General criteria. Environmental standards in piglets, sows and boars.

Lesson 18. HOUSING OF DRY AND PREGNANT SOWS. European Directive of welfare. Individual stalls and group housing systems. Ad libitum feeding. Free access stalls. Short stalls. Electronic sow feeding system.

Lesson 19. HOUSING OF SOWS DURING FARROWING AND LACTATION. General criteria. The farrowing crate. Types. The farrowing pen. Possibilities of providing heat to piglets. Infrared lamps and heated floor.

Lesson 20. HOUSING OF WEANED PIGLETS. European welfare legislation. General criteria. Group size. General design and materials. Feeders and drinkers. Heating systems. Open facilities.

Lesson 21. HOUSING OF GROWING AND FINISHING PIGS. European welfare legislation. General criteria. Group size. General design and materials. Feeders and drinkers. Wean to Finish system.

Lesson 22. FARM PLANNING (I). Batch management farrowing system. Pros and cons. Farrowing every week vs every 3 and 5 weeks comparison.

Lesson 23. FARM PLANNING (II). Dimension and design of facilities for pigs. Practical examples.

Lesson 24. PIG FEEDING. Legislation. Labelling. Crossing contamination of medicated compound feeds.

Lesson 25. PIG FEEDING. Conventional and no conventional feedstuffs. Feed distribution. Liquid feeding.

Lesson 26. WEANED PIGLET FEEDING. Physiological characteristics. Additives. Starter feeds. Nutrition and pathology. Feed management.

Lesson 27. GROWING AND FINISHING PIG FEEDING. Sex, genetics and environment interactions. Protein retention. Energy consumption. Fat pig feeding.

Lesson 28. SOW FEEDING. Feeding management of replacement sows. Pregnant sows. Flushing. Effect of nutrition on fertility.

Lesson 29. SOW AND BOAR FEEEDING. Feeding of sow during farrowing and lactation. Body fat reserves mobilization. Lactating piglet growth. Boar feeding.

Lesson 30. PIG FEEDING. Environmental impact. N and P contamination. Trace elements.

Lesson 31a. HYGIENE AND MANAGEMENT OF SOWS (I). Culling causes analysis in pig farms. Culling rate. Replacement sows management. Intrinsic and extrinsic factors influencing fertility.

Lesson 31b. HYGIENE AND MANAGEMENT OF SOWS (II). Lactating sow management. Milk production. Weaning and onset of oestrus. Live weight of piglets at farrowing. Factors of variation. Fostering. Piglet mortality before weaning.

Lesson 32. HYGIENE END MANAGEMENT OF GROWING ANDD FINISHING PIGS. Intrinsic and extrinsic factors influencing growth, conversion index and other production traits. Casualties causes. Animals to and from management.

Lesson 33. CARCASS AND MEAT QUALITY IN PIGS. Commercial types. Carcass dressing percentage and quality. Tissue composition. Basic criteria in pork quality. Carcass classification. Legal rules.

Lesson 34a. OUTDOOR PIG PRODUCTION. Camping system. Aims, pros and cons. Management and financial analysis. Organic pig production.

Lesson 34b. IBERIAN PIG PRODUCTION SYSTEM. Genetic basis. Ecosystem analysis. Traditional breeding system of the Iberian Pig. The "dehesa". Sows and growing pigs management. The "montanera" fattening system. Intensive breeding systems adapted to the Iberian pig. Feeding of the Iberian pig in both intensive and traditional systems.

Lesson 35. MULTISISTEMIC DISEASES (I). Porcine Reproductive & Respiratory Syndrome (PRRS).

Lesson 36. MULTISISTEMIC DISEASES (II). Porcine circoviroses (PMWS & PDNS)

Lesson 37. MULTISISTEMIC DISEASES (III). Erysipela (Erysipelothrix rhusiopathiae)

Lesson 38. MULTISISTEMIC DISEASES (IV). Streptococosis (Streptococcus suis), Glässer's disease (Haemophilus parasuis) and Oedema disease.

Lesson 39. ENFERMEDADES MULTISISTÉMICAS (V). Trichinellosis, cysticeercosis, toxoplasmosis.

Lesson 40. DIGESTIVE PATHOLOGY (I). Introduction to digestive pathology.

Lesson 41 DIGESTIVE PATHOLOGY (II). Main gastroenteritis process in the lactation and growing processes

Lesson 42. DIGESTIVE PATHOLOGY (III). Other digestive pathologies I: Mouth, Gastric ulcers and Gastritis.

Lesson 43 DIGESTIVE PATHOLOGY (IV). Other digestive pathologies II: Rectal prolapse, rectal herniae, peritonitis and liver damages.

Lesson 44. DIGESTIVE PATHOLOGY (V). Porcine epidemic diarrhoea (PED) and Transmissible gastroenteritis (TGE).

Lesson 45. DIGESTIVE PATHOLOGY (VI). Scour (Escherichia coli) and Salmonellosis.

Lesson 46. DIGESTIVE PATHOLOGY (VII). Ileitis (Lawsonia intracellularis), Swine dysentery (Brachyspira hyodisenteriae) and Intestinal spirochetosis (Brachyspira pilosicoli).

Lesson 47. DIGESTIVE PATHOLOGY (VIII). Necrotic enteritis (Clostridium perfringens) and other clostridiosis (Cl. difficile and Cl. novyi).

Lesson 48. DIGESTIVE PATHOLOGY (IX). Coccidiosis.

Lesson 49. DIGESTIVE PATHOLOGY (X). Ascariasis and other parasitic diseases by nematodes

Lesson 50. RESPIRATORY PATHOLOGY (I). Introduction to respiratory pathology. Bronchopneumonia, pleurisy.

Lesson 51. RESPIRATORY PATHOLOGY (II). Swine Influenza and Enzootic pneumonia (Mycoplasma hyopneumoniae)

Lesson 52. RESPIRATORY PATHOLOGY (III). Porcine pleuropneumonia (Actinobacillus pleuropneumonía) and other Actinobacillosis (A. suis and A. equuli)

Lesson 53. RESPIRATORY PATHOLOGY (IV). Atrophic rhinitis , Pasteurellosis (Pasteurella multocida) and Bordetellosis (Bordetella bronchiseptica).

Lesson 54a. RESPIRATORY PATHOLOGY (V). Metastrongylosis.

Lesson 54b. SKIN PATHOLOGY (I). Scabies and ticks.

Lesson 55. SKIN PATHOLOGY (II). Staphyloderma, Pporcine parakeratosis. Porcine erysipela and dermatitis-nephrosis syndrome.

Lesson 56. OTHER PATHOLOGIES (I). Urinary system pathology. Congenital cysts, nephritis, pyelonephritis. polycystic kidneys.

Lesson 57 OTHER PATHOLOGIES (II). Nervous system pathology. Muscle pathology. Bone pathology.

Lesson 58. REPRODUCTIVE PATHOLOGIES (I). Reproductive pathology of sows: Congenital diseases, anestrus, silent estrus, estrus repetition. Pregnancy pathology, Seasonal, casual and toxic abortions. Farrowing pathology.

Lesson 59. REPRODUCTIVE PATHOLOGIES (II). Infectious abortions: Parvovirosis, Leptospirosis and Brucelosis.

Lesson 60. REPRODUCTIVE PATHOLOGIES (III). Postpartum pathology: Postpartum metritis. Dirty sow syndrome.

Lesson 61. REPRODUCTIVE PATHOLOGIES (IV). Lactation pathology: Mastitis. Postpartum dysgalaxia syndrome. Mastitis-metritis-agalactia syndrome.

Lesson 62. REPRODUCTIVE PATHOLOGIES (V). Boar reproductive pathology. Libido, erection and ejaculate abnormalities. Brucellosis.

Lesson 63. REPRODUCTIVE PATHOLOGIES (VI). In-farm anesthesia and surgery techniques: Castration, caesarean section, vasectomy, prolapses, reproductive biotechnology.

Lesson 64. COMPULSORY NOTIFICATION DISEASES (I). Vesicular diseases: Foot and mouth disease, Swine vesicular disease, Vesicular stomatitis y Vesicular exanthema

Lesson 65. COMPULSORY NOTIFICATION DISEASES (II). Classical swine fever and African swine fever

Lesson 66. COMPULSORY NOTIFICATION DISEASES (III). Aujeszky's disease

PRACTICAL TRAINING SCHEDULE

Fourteen practical sessions. Total: 33.15 hours of practical training per student.

Practical session 1. PIG COMMERCIAL FARM. Study of genetic basis, batch organization and feeding. Management of farrowing, IA, weaning and finishing. 1 teacher: 4 h x 36 groups of students.

Practical session 2. COMPUTER SIMULATION OF GENETIC CONTROL OF A SELECTION PORCINEPOPULATION. Maternal and paternal lines. Selection and crossing. 1 teacher: 2 h x 12 groups of students.

Practical session 3. PIG REPRODUCTION TECHNOLOGY. 1. PIG TEACHING FARM OF THE VETERINARY FACULTY. Sow choice. Gilt reproductive examination. Body condition assessment. Heat detection. AI. "Management and exploration of the sow. 1 teacher: 3 h x 24 groups of students.

Practical session 4. PIG REPRODUCTION TECHNOLOGY. 2. PIG TEACHING FARM OF THE VETERINARYFACULTY. Boar examination. Semen recovery. Reproductive examination of the pregnant sow. pregnancy diagnosis. Farrowing preparation. 1 teacher: 2.75 h x 24 groups of students.

Practical session 5. SEMINAL DOSIS PREPARATION IN LAB FOR AI. Spermiogram, dilution, preservation. Computer management of seminal doses. Semen refrigeration and freezing. 1 teacher: 2 h x 24 groups of students.

Practical session 6. BUILDING MATERIALS AND ENVIRONMENTAL CONTROL IN PIG FARMS. EXPERIMENTALFARM OF THE VETERINARY FACULTY. Building materials and building techniques. Practical ventilation. Thermal isolation. 1 teacher: 2 h x 12 groups of students.

Practical session 7. COMPUTER PROGGRAM OF TECHNICAL MANAGEMENT OF PIG FARMS. COMPUTERROOM. Output analysis. Technical indexes analysis. 1 teacher: 2 h x 12 groups of students.

Practical session 8. FEEDING (1). COMPUTER ROOM. Diet formulation for sows. 1 teacher: 2 h x 12 groups of students.

Practical session 9. FEEDING (2). COMPUTER ROOM. Diet formulation for growing pigs. 1 teacher: 2 h x 12 groups of students.

Practical session 10. MEAT AND CARCASS QUALITYY. MEAT LAB. 1 teacher: 2 h x 12 groups of students.

Practical session 11. MICROBIOLOGICAL EVALUATION OF SEMINAL DOSIS. REPRODUCTION LAB. 1 teacher: 1.5 h x 24 groups of students.

Practical session 12. PARASITOLOGICAL DIAGNOSIS IN LAB. Intestinal, tisular and cutaneous parasites. 1 teacher: 2 h x 24 groups.

Practical session 13. NECROPSY ROOM. Clinical cases necropsy. 2 teachers: 3 h x 12 groups.

Practical session 14. CLINICAL CASES IN PIGLETS AND GROWING PIGS. 1 teacher: 2 h x 12 groups.

Practical session 15. CLINICAL CASES IN PIGLETS AND SOWS. 1 teacher: 2 h x 12 groups.

Course planning and calendar

Dates and scheduling of lectures and practical training of the subject can be found in the web page of the Veterinary Faculty at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28443

Universidad Zaragoza

Year : 2018/19

28436 - Laboratory Animal Science - II

Syllabus Information

Academic Year: 2018/19

Subject: 28436 - Laboratory Animal Science - II

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 3.0

Year:

Semester: Second semester

Subject Type: Optional

Module: ---

General information

Aims of the course

The subject of Laboratory Animal Science - II provides students with complementary knowledge to that of other subjects in the degree, but closer to the species most frequently used in experimentation, such as rodents (rat and mouse) and rabbit. In this way it complements the subjects of integration in different species of the same year and others previously seen as general pathological anatomy, general and propaedeutic pathology, surgical pathology, surgery and anaesthesiology, epidemiology and biostatistics or ethnology and animal welfare.

The general objective of the course is to study the main pathologies and health controls in the most frequently used animal species in experimentation, the most suitable anaesthetic, analgesic and euthanasic protocols in each of them, the steps to carry out a good design and experimental development with animals, as well as the main guidelines for the publication of results in animal studies.

Context and importance of this course in the degree

The subject of Laboratory Animal Science II allows students to complete their training in this field transversally, so after completing the subject and the degree, they can have sufficient autonomy to carry out the necessary competences attributed by the regulations for personnel who conducts and designs procedures with experimental animals.

Recommendations to take this course

The student must have passed Laboratory Animal Science I

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Recognize the most frequent pathologies in experimental animals, the way to approach them, both from the point of view of their detection, eradication and prevention.
- Explain the most relevant anaesthetic, analgesic and euthanasic procedures in the main experimental animal species, as well as the signs of pain in these species.
- Explain the design stages of a procedure with experimental animals and the aspects to be taken care of in order to comply with the ethical principle of the 3 R's.
- Analyze scientific literature in which experimental animals are used.

Learning outcomes

If students complete the course successfully, they should be able to

- Know the most common pathologies in experimental animals and the basis for establishing the controls that guarantee a high sanitary quality of laboratory animals.
- Know, describing and applying the main anaesthetic, analgesic and euthanasic procedures in the main species of laboratory animals and their influence on animal welfare and experimental results.
- Know how experimental procedures are planned, developed and supervised in the main research areas.
- Apply refinement to the main experimental procedures in surgery and to the procedures for administering substances and obtaining biological samples.
- Apply statistical methods to experimental design.
- Know the information that a scientific article should contain in the field of animal experimentation.

Importance of learning outcomes

They make possible to integrate the knowledge of biology, physiology, behaviour and welfare of experimental animals with the pathology and main surgical procedures, sampling and administration of substances. At the same time, it facilitates the global vision in the student about the importance of the good design and refinement of the procedures in which experimental animals participate as a necessary requirement both from the point of view of animal welfare and the obtaining of reliable results in research.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities.

A global exam of the subject, to be taken on the date determined by the Centre, which will assess both theoretical and practical knowledge. It will consist of a written test consisting of 30 multiple-choice questions with 4 answer options. Each right answer is 1 point and wrong answers 0 points. The score will be from 0 to 10.

Valuation criteria and requirement levels

In order to pass the course it will be necessary to obtain a total score of at least 5 points out of a maximum of 10. In accordance with the Regulations for the Evaluation of Learning Standards of the University of Zaragoza

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that has been designed for this subject is based on the following:

- **Lectures:** Participatory lectures will be taught in the classroom to one group of students.
- **Practical classes:** Initially, the teacher will make a short explanation of the session and after that, the students will perform the practice under the permanent supervision of the teachers.

Learning tasks

- **Lectures:** Theoretical classes (20 hours) will be taught in the schedule established by the Faculty.
- **Practical classes:** A total of 10 hours of practice, distributed in 6 sessions, will be taught in the Laboratory of Physiology, room of Necropsies, Clinic Hospital or in the Computer room. Dates of the practices will be announced in advance, in such a way that the students choose for the date that best suits them.

Summary table of teaching-learning activities

ACTIVITY	ATTENDANCE HOURS	FACTOR	SELF STUDY HOURS	TOTAL
Lectures	20	1,5	30	50
Practices	10	1	10	20
Exams			3	3
Total	30		43	**73**

Syllabus

The program offered to help the student achieve the expected results includes the following activities:

PROGRAM OF LECTURES

Lectures are divided into 4 thematic blocks, with the timing and assignment of hours listed below.

VI. MICROBIOLOGY AND DISEASE (5 h)

- Unit 1. Health monitoring and disease prevention. Health monitoring programme in experimental units.

- Unit 2. Pathology of common animal laboratory diseases.

- Unit 3. Safety in working with infectious animals.

VII.ANAESTHESIA, ANALGESIA AND EXPERIMENTAL PROCEDURES (9 h)

- Unit 4. Introduction to methods of anaesthesia. Anaesthetics and analgesics. Choice of anaesthetic agent in relation to animal species and nature of experiment.

- Unit 5. Analgesia. Recognition, assessment and control of pain, suffering or distress.

- Unit 6. Euthanasia: chemical and physical methods. Disposal of carcasses.

- Unit 7. Experimental procedures in surgery. Principles of surgery, facilities, surgical equipment, aseptic techniques, special perioperative considerations. Postoperative care and monitoring.

- Unit 8. Refining procedures for the administration of substances. Biological sampling collection.

- Unit 9. Experimental procedures in pharmacology, toxicology, microbiology and infectious diseases.

VIII. Design and conduct of animal experiments (5 h)

- **Unit 10.** Experimental design. Guidelines for good design. Choice of the experimental animal and power analysis to calculate the number of animals. Statistical analysis and interpretation of results. Designs applied in animal experimentation.

Unit 11. Animal models (spontaneous, induced).

IX. ANALYSIS AND ELABORATION OF SCIENTIFIC LITERATURE (1 h)

Unit 12. Analysis and elaboration of scientific literature.

PROGRAM OF PRACTICAL CLASSES

The program consists of 10 hours of practical activities, distributed into 6 sessions:

Only Practice 3 involves working with live animals. This practice has been subjected to prior evaluation by the Advisory Ethics Committee for Animal Experimentation of the University of Zaragoza (License number PD05/14). The carcasses used in Practice 1 and 4 come from animals which have not expressly been euthanized for the practice.

- **Practice 1.** Necropsy in experimental animals. Technique and sampling. Recognition of macroscopic lesions of organs and tissues in the mouse, rat and rabbit (2 hours).
- **Practice 2.** Workshop on pain recognition (2 hours).
- **Practice 3.** Administration of substances. Sample collection in rabbit (1 hour).
- **Practice 4.** Surgical procedures in experimental surgery (2 hours).
- **Practice 5.** Workshop on experimental design of procedures (2 hours).
- **Practice 6.** Evaluation of procedures by ethics committees (1 hour).

Course planning and calendar

Calendar of attendance sessions

Dates of delivery of the lectures will be available on the website of the Faculty of Veterinary Medicine (link:

http://veterinaria.unizar.es/). This link will be updated at the beginning of each academic year.

Dates of delivery of practical classes will be announced in advance, in such a way that the students choose the best date that suits them.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28436

Universidad Zaragoza

Year : 2018/19

28437 - Wildlife

Syllabus Information

Academic Year: 2019/20 **Subject:** 28437 - Wildlife **Faculty / School:** 105

Degree: 451 - Degree in Veterinary Science

ECTS: 3.0

Year:

Semester: Second semester

Subject Type: Optional

Module: ---

General information

Aims of the course

The initial goal of the course is that the student understands and assumes the role of the veterinarian with the wildlife, and zoological nuclei. These actions include management, handling, medicine, health and conservation of wildlife species and hunting in local and global contexts. The course will also promote understanding of the role of the wildlife veterinarian in the basic and applied research potential of the area.

Students will understand the individual of a particular species as part of an ecosystem and will understand its interrelationship with animal and human health. Likewise, students will begin to develop skills, abilities and aptitudes that allow them to identify, recognize, hierarchize and capitalize the wildlife resources and will be able to collaborate in the design of management and conservation policies.

Context and importance of this course in the degree

This course prepares students to know and understand the basic aspects of wildlife management, medicine, health and conservation in local and global contexts, always from the point of view of the work that the veterinarian can develop in this field. The purpose of the Wildlife program is to transmit to the student the essential knowledge that forms the basis of veterinary science applied to wildlife. The student will receive basic training that will allow him/her to apply this knowledge as a veterinarian to the needs of wildlife in each time and situation.

In the Veterinary Degree at the University of Zaragoza, attention is paid to exotic animals (usually wild animals displaced from their natural environment and used as pets or "New Companion Animals") but there is no other subject dealing with the role of veterinarians in native wildlife. For this reason, this subject provides the Grade with a unique, multidisciplinary and transversal vision. While trying to teach genuine and probably unknown aspects for the students, at the same time, it tries to avoid repetition of contents with other subjects, of which the student will have to have the basic knowledge.

Recommendations to take this course

Wildlife tries to cover a very wide and diverse agenda, with a marked multidisciplinary character, in a short period of time and, therefore, it is highly recommended to attend all theoretical and practical sessions. Having acquired the competencies of the 1st, 2nd and 3rd courses of the Degree in Veterinary Medicine will ease their learning capacity on the subject. Likewise, the students should have an average knowledge of biology, beyond what they have learned in the Degree. The study of the wildlife in veterinary implies knowing what is its interrelation with the environment and, therefore, the knowledge of the aspects of bio-ecological interest of the main wild species. As in almost all subjects, it is very important to have a basic knowledge of English (minimum level B1) since the vast majority of the bibliography is in that language. The student should have passed subjects such as Epidemiology and Biostatistics, Ecology and Environment, Ethnology and Animal Welfare, Agronomy, Genetics, Parasitology, General Pathology and General Pathology.

Competences and Learning outcomes

Competences

Cross-cutting generic competences

The transversal competences that will be developed in the subject are:

T04 Basic general knowledge of the area of work

T11 Information management skills

T13 Ability to adapt to new situations T16 Decision-making

T17 Teamwork

T20 Ability to work in an interdisciplinary team

Specific competences

The specific competencies that will be developed in the subject are:

FBC03 Morphology, bionomy and systematics of animals and plants of veterinary interest FBC18 Ethical principles of the veterinary profession

FBC19 Veterinary rules and regulations CCSA02 Diagnostic imaging and radiobiology CCSA03 Necropsy

CCSA04 Recognition and diagnosis of different types of lesions and their association with pathological processes CCSA07 Diagnosis

CCSA17 Infectious and parasitic diseases of veterinary interest including diagnosis and control.

CCSA19 Health promotion in animal groups, including wild animals, in order to obtain maximum economic return in a socially, ethically and healthily acceptable manner.

CCSA20 Technical measures and regulations for the prevention, control and eradication of animal diseases.

Learning outcomes

If students complete the course successfully, they should be able to

1. Know and interpret the legal framework on the conservation of wildlife (fundamentally autonomous, national, European and international).
2. Know wildlife conservation strategies and the performance of a veterinarian in different scenarios, such as, for example, the conservation of endangered species, crimes related to the protection of fauna, conservation methods, etc.
3. Know the role of the veterinarian in a wildlife recovery centre: first aid, care, surgery, captive maintenance, recovery and release. Know the material, infrastructure and environments needed in rehabilitation centers.
4. Know the role of the veterinarian in the regular management and application of national legislation on hunting grounds. Knows how to establish active and passive surveillance programs.
5. Know the role of a veterinarian in collections, zoos and aquariums.
6. Is capable of assessing, diagnosing and treating the most frequent pathologies in wildlife: trauma, collisions, electrocutions, infectious and parasitic diseases.
7. Be familiar with the management of wounds and trauma, with the methodologies adapted for better individual and population care, with the interpretation of the different methods of diagnosis. It is capable of making appropriate decisions: sampling, treatment or euthanasia, among others.
8. Know the genetic balance and be able to analyse the genetic mechanisms that deteriorate the genetic structure of populations. Knows the effect of inbreeding, endogamia and mutation in the deterioration of the biological efficacy of the population.

Importance of learning goals

The student who has passed this course will have the minimum knowledge to begin the work of a veterinarian in any of the fields within wildlife: wild animals, hunting and zoo nucleus. This will open up a series of job opportunities that will ease their integration into the labour market. Likewise, this subject is important for its transversal aspects, relating multiple fields of veterinary medicine in one.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

Written test

The acquisition of knowledge and skills transmitted in theoretical classes, seminars and, in most practices, will be assessed. It will be a multiple-choice question exam (4 options, just one right answer, no negative points) of 45 questions: 30 of theoretical knowledge and 15 of practical knowledge. The exam will be considered passed with the minimum mark (5) if 60% of its total value is exceeded, i.e. if 27 questions are answered correctly. The value of this test will represent 95% of the final mark.

Practice

The practice "Review of a topic" will be assessed through attendance and presentation of a paper by the group of students attending. The practice will be graded by its responsible teacher and its numerical value will oscillate between 0 and 10. The value of this practice will represent 5% of the final grade.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Tests for students who are not present or those who present themselves in other calls other than the first one.

The same type of examination will be applied for the written test. For the practical evaluation the pupil will perform a necropsy of a wild animal (bird/mammal/reptile) where he will have to demonstrate the ability to carry it out and to interpret the findings.

Methodology, learning tasks, syllabus and resources

Methodological overview

Due to the low number of credits in this topic, the main goal is to make an approach to the different subjects mostly using lecturer presentations, seminars, laboratory demonstrations and problem solving exercises.

Learning tasks

Lectures. 15 h

They will be undertaken using computer presentations that will include development of ideas, figures, images, graphics and layouts. Students will previously have the teaching material through the so called digital ring of the Unizar (ADD). The participation of students in posing questions or discussion of issues of particular relevance will be encouraged.

Developing skills

Skill in handling concepts. Ability to integrate ideas. Ability to relate concepts. Development of critical thinking. Ability to understand the field of veterinary professional performance in the recovery, conservation and maintenance of wild species. Ability to analyze information from different sources. Ability to consult bibliography.

Demonstrations. 15 h

Laboratory demonstrations and problem solving exercises (6 h)

They will include post mortem examination of wild animal or solving exercises under teacher supervision.

Seminars (4 h)

Two seminars will be performed, topics to be defined in each academic year.

External visits (5 h)

Two visits are programmed: (i) to the “La Alfranca” Wildlife Recovery Center and the “Los Sotos y Galachos del Ebro” Nature Reserve and (ii) to the Zaragoza's aquarium.

Syllabus

Lectures

Topic 1-2: Wildlife management: Concepts. Hunting species

Topic 3-4: Wildlife conservation strategies

Topic 5-8: Genetics

Topic 9: Recovery plans

Topic 11-13: Wildlife rescue centers. Medicine and surgery

Topic 14-15: Animal health. Infectious and parasitic diseases

Demonstrations

Review of a topic (3)

Seminars (3)

Post mortem studies of wildlife (2h)

External visits (7h)

Course planning and calendar

Calendar, schedules, mentoring and examination shall comply with the provisions of the academic calendar of the University of Zaragoza and the Faculty of Veterinary Medicine. The information will be available in Moodle on line course since the beginning of the academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28437

Universidad Zaragoza

Year: 2018/19

28438 - Bee Production and Health

Syllabus Information

Academic Year: 2018/19

Subject: 28438 - Bee Production and Health

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 3.0

Year:

Semester: Second semester

Subject Type: Optional

Module: ---

General information

Aims of the course

The general goal of the course is the acquisition by the students of the learning of Apiculture Management, Production and Health.

In order to achieve this general objective, the specific learning objectives of the subject of Bee Production and Health are:

- knowing the population, behavior, needs and management of the hive.
- Knowing the breeds and bee reproduction
- Knowing bee production
- Knowing the flora and melliferous vegetation
- Knowing the bee pathology
- Know the quality criteria of bee products
- To know the economy and commercialization of apiculture products.
- Being Familiar with bee production and health legislation

Context and importance of this course in the degree

The subject of Bee Production and Health should help students acquire the necessary skills to be able to know in an integrated way all those aspects related to bee production and health.

Recommendations to take this course

The student should have taken the subjects of Biology and Biochemistry, Economics and Business, Agronomy, Genetics, Microbiology, Parasitology and Pharmacology and pharmacotherapy.

It is important that the student informs if he suffers any type of allergies (especially to bee stings).

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Know the population, behavior, needs and management of the hive.
2. Know the main species, subspecies and breeds of the bees and with it to be able to apply the programs of genetic improvement to obtain more productive and resistant populations to pathologies. To be able to apply

reproductive strategies and procedures to production.

3. Understand the basics of beekeeping management and production.
4. Differentiate and value different types of species and important plant formations in bee production, at both local and regional scales. To interpret bee transhumance in relation to the availability of food associated with the phenology of plant species. To value the contribution of beekeeping to pollination and biodiversity. To value the importance of the type of food (melliferous flora) in the organoleptic and analytical qualities.
5. Know the pathological processes that affect bees and to apply the theoretical and practical knowledge of beekeeping pathology to real contexts.
6. Know and typifying apiculture products. To know the parameters that determine their quality control.
7. Understand the economic relevance of the beekeeping sector. Analyse production costs and interpret the economic value of production and explain what factors influence consumption.
8. Know the legislation related to the beekeeping sector as well as to know how to use the tools for its interpretation. Interpreting and applying the corresponding legislation in different situations that may arise in their professional environment.
9. Communicate correctly and effectively, using the appropriate scientific terminology related to the subject.

Learning outcomes

If students complete the course successfully, they should be able to:

1. Know the population, behaviour and needs of bees. It is also able to inspect a hive, control defensive behaviour, assess the risk of stinging and overcome fear.
2. Know the main species, subspecies and breeds. It also knows how to apply genetic improvement programmes.
3. Know the reproductive characteristics of the different individuals of the hive and the reproductive management procedures that allow the increase of productivity and health of the hive, as well as carrying out the management for the breeding and rational exploitation of a hive.
4. Know the main types of hives and their components, as well as the complementary material. Know the beekeeping calendar and the main management actions to be carried out in each season.
5. Differentiate the main groups and plant species of interest for bee production, as well as to indicate their geographical distribution and the relationship of their phenology with transhumance. In addition, it is able to value in melliferous terms, different types of vegetation and to describe the ecological services provided by beekeeping.
6. Know and recognise the different pathologies that affect bees and of carrying out the differential diagnosis of the different processes. It must also demonstrate that it has acquired the necessary skills to collect samples and carry out certain diagnostic tests in order to identify the causal agent, as well as to apply therapeutic protocols and appropriate strategies for the prevention, control and/or eradication of the main diseases.
7. Know the hygienic, nutritional and pharmacological characteristics of the products of the beehive, as well as their properties and quality indicators. They must know their classification according to technological and legal criteria and they must know how to carry out an adequate quality control by means of appropriate analysis methods.
8. Know the economic importance of the Spanish beekeeping sector. Understands and is able to explain the economic concepts of "market failure" and "externality". He knows the productive structures of Spanish beekeeping and the economic characteristics. Knows the Spanish and EU foreign trade of apiculture products and the characteristics of the internal market and consumption. Find out what are considered to be the strengths and weaknesses of the Spanish beekeeping sector. Get to know the systems of support for the sector implemented in Spain.
9. Know and interprets the legislation related to the beekeeping sector.

Importance of learning goals

They make it possible to understand and know the fundamental aspects of Apiculture Production and Health.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment

criteria)

Evaluation activities

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

- **Theoretical sessions** will be evaluated by means of a written exam consisting of 50 multiple choice questions (with 4 options), with error penalty (value of the question divided by the number of options). The questions will be representative of the different thematic blocks. Passing these tests will accredit the achievement of learning outcomes 1, 2, 3, 4, 5, 6, 7, 8, and 9.

The grade will be from 0 to 10, and it will be necessary to obtain a 5 to overcome it.

The grade will be 70% of the student's final grade in the subject, as long as it has been passed.

- **Practice sessions** the attendance, the use and the acquisition of abilities and skills in the execution of the different practices (laboratory and visits to exploitations and industries of the sector) will be assessed.

Overcoming them will guarantee the achievement of part of learning outcomes 1, 3, 4, 5, 6, 7 and 9. Failure to attend any of the practices will lead to the examination of the same in the official calls together with the

theory test.

The grade will be from 0 to 10, and it will be necessary to obtain a 5 to pass it.

The grade will be 30% (15% laboratory practice + 15% field practice) of the student's final grade in the subject, provided it has been passed.

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that is designed for this subject is based on the following:

The theoretical class is structured into 8 thematic blocks, divided into 24 lessons and taught in 19 sessions (fifty minutes each), and 11 hours of practical training, divided into 6 hours of laboratory practices and 5 hours of field practices to visit apiaries and industries related with the sector.

The lectures will develop the theoretical concepts detailed in the program of the subject (see program). It is planned to deliver the documentation for each issue available to students in the virtual campus of the University (ADD) or in the reprographics service.

In the laboratory, the practical program detailed below (see program) is performed. The laboratory training consists in 6 hours of practice, distributed in 4 sessions. Initially an explanation of the session is taught and then students do the practice under the supervision of the teacher. Students will have a handbook of practical activities to work in the laboratory. Field practices consist in an visit to apiaries; to visit an apiary and melliferous flora and vegetation types identification around the beehives (3h) and an industry of bee products (honey, wax, propolis) (2h). In the activity, the teacher and the owner of the industry will be present.

Learning tasks

The program offered to the student in order to achieve the expected results includes the following activities:

Theoretical classes: 19 hours of theoretical activities, divided into 8 thematic blocks and consisting in 24 lessons. **Laboratory practice:** 6 hours of practical training, divided into four sessions.

Field practices: 5 hours of field training consisting of supervised visits to apiaries and to industries and businesses in the sector.

Syllabus

THEORETICAL TEACHING (19 HOURS)

1. Population, behaviour, requirements and management of a colony (2h)

Lesson 1.- Introduction: historical and current relevance of beekeeping. Anatomy, physiology and biology of the bee (*Apis mellifera*). Worker, queen and drone. Biological cycle.

2. Genetics and Reproduction (3h)

Lesson 2.- Species and breeds. Breed concept in beekeeping. The ideal breed. Main species. Main European and

African breeds of *Apis mellifera*. Asiatic breeds. Crossbreeds.

Lesson 3.- Queen bee and drone genital organs. Nuptial flights. Worker bee genital organs features.

Lesson 4.- Development. Sex determination and castes. Parthenogenesis.

Lesson 5-Swarming and hive reproductive management.

Lesson 6.- Rearing queen bees and artificial insemination.

3. Bee production (2h)

Lesson 7.- The hive. Introduction. Hive types. General characteristics. Parts of a common hive. Equipment and materials in beekeeping. All it is needed to obtain honey and other products from the bees. General tools.

Lesson 8.- Management general in the practical beekeeping. Beekeeping calendar. Main activities to do before and after the honeydew. How prepare the hive to the winter time and other periods with low global activity.

4. Melliferous flora and vegetation (2h)

Lesson 9.- Melliferous flora and vegetation. Main plant resources for bees: nectar, pollen, honeydew, juices, propolis. Geographic areas with bee foraging resources.

Lesson 10.- Phenology and Transhumances.

Lesson 11.- Ecosystem services of Beekeeping: entomophylous pollination. Plant-bee co-evolution.

Lesson 12. - Assessment of the feeding value of melliferous vegetation types. Regional assessment.

5. Bee pathology (4h)

Lesson 13.- Factors affecting disease outbreaks and severity.

Lesson 14.- Fungal diseases. Chalkbrood (*Ascosphaera*). Stonebrood (*Aspergillus*)

Lesson 15.- Bacterial diseases. American foulbrood, European foulbrood. Other bacterial diseases.

Lesson 16.- Viral diseases: Paralysis virus, Sac brood virus. Other viral diseases.

Lesson 17.- Parasitic diseases: varroosis, nosemosis and acarapisosis

Lesson 18.- Colony Collapse Disorder (CCD). Other processes (biotic and abiotic) that affect bees and hives.

6. Quality control of bee products (2h)

Lesson 19.- Quality of honey. Definition. Types of honey. Bromatological composition. Components of nutritional interest. Contaminants. Toxic honeys. Quality control.

Lesson 20.- Other products of the hive. Definition. Types of bee products. Bromatological composition. Components of nutritional interest. Contaminants. Quality control

7. Economics and marketing of apiculture/beekeeping products (2h)

Lesson 21.- Introduction to the Spanish economy concerning beekeeping sector. The economic and environmental importance of the sector. Market failure and externality concepts.

Lesson 22.- Production structures, production, demand and marketing. Censuses, agricultural holdings and regional distribution. Production costs. Economic quantity and value in the production. Consumption: differentiated products and quality schemes. Spanish and E.U. foreign trade. Market prospects.

Lesson 23.- Support systems. The strengths and weaknesses of the sector. Structural and quality support measures. National Beekeeping Plan. Future prospects of the beekeeping sector. Strategic recommendations.

8. Legislation (2h)

Lesson 24. - Current legal framework on beekeeping activity, production and bee health.

PRACTICAL TRAINING (11 HOURS)

- Laboratory training: (6h)

Practical activity 1. - Anatomy of *Apis mellifera* (brood and adult). Laboratory diagnosis of infectious and parasitic diseases (3h).

Practical activity 2. Presentation of semen collection and queen bee artificial insemination (1h).

Practical activity 3. - Melliferous flora and vegetation types identification (1h)

Practical activity 4.- Sensory evaluation of honey. Quality of honey (1h).

-Field training: (5h)

. Visit to an apiary: biology, management and health beekeeping

. Recognition of flora and honey bee vegetation

. Visit to industry and / or commerce of the sector: beekeeping and hygienic-sanitary aspects of the production and commercialization of the products.

Course planning and calendar

Schedule sessions and presentation of works

The dates and key milestones of the subject are described in detail, (along with those of the rest of subjects of fourth year in the Degree in Veterinary Medicine), on the website of the Faculty of Veterinary Medicine (link: http://veterinaria.unizar.es/gradoveterinaria/). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28438&year=2019

Universidad Zaragoza

Year : 2018/19

28439 - Food Technology

Syllabus Information

Academic Year: 2018/19

Subject: 28439 - Food Technology

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 12.0

Year: 5

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

Among the functions assigned to veterinarians in society, it is worth highlighting their role as guarantors of Public Health through the control of hygiene and inspection in the processes of obtaining, transforming and distributing food, especially of animal origin, until it reaches the consumer. The module called "Hygiene, Technology and Food Safety" aims, among others, to train future graduates for this professional profile. This module consists of two subjects. Food Technology" and "Hygiene, Food Inspection and Control". In turn, each of these subjects consists of two blocks: one whose name corresponds to the subject and another called Practicum.

The general goal of the Food Technology block is to provide knowledge on the composition and quality parameters of food and on the fundamentals of the processes of alteration, conservation and processing of food of animal origin required to train future graduates to perform functions related to food inspection and quality control and food safety.

The Practicum intends that future graduates understand, in addition to the influence of raw material characteristics and processing parameters on sensory quality, nutritional quality and food safety, the usefulness of carrying out food safety management applying a preventive approach as opposed to the traditional system based on the inspection and sampling of the final product. In addition, this activity will enable future graduates to adequately supervise good hygiene practices. In order to achieve this objective effectively, part of the Practicum will be taught together with the subject "Hygiene, inspection and food control", if the students are enrolled in both subjects, as recommended.

Context and importance of this course in the degree

The mission of the veterinarian in our society is not just to prevent and heal animal diseases or to improve the productive performance of livestock farms. Besides, another remarkable veterinarian´s role is to guarantee Public Health through the control of hygiene and inspection in the processes of obtaining, transforming and distributing food, especially of animal origin, until it reaches the consumer It is not only necessary to have knowledge of the main technological processes involved in the production of food of animal origin in order, but also to understand the fundamentals of properties, alterations and treatments for food preservation and transformation.

Recommendations to take this course

In addition to the knowledge provided by the common basic training module, in order to take this subject, it is recommended to have previously taken the subjects of Animal Physiology, Microbiology and Immunology and Agronomy; and the part related to animal production of the integrations in ruminants, pigs, birds and rabbits and aquatic animals. Also, the first joint registration should be done together with the subject of Hygiene, Inspection and Food Control.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Know and interpret the fundamentals of the processes of the food processing industry of animal origin.
- Design, implement and oversee the quality management systems used by the food industry
- To advise food processing companies of animal origin on aspects related to food safety.
- Analyze, synthesize and solve problems and make decisions in professional areas.
- Improve communication, argumentation and negotiation skills.

Learning outcomes

If students complete the course successfully, they should be able to:

- Know the main components of food and recognize the importance of sensory, nutritional and safety properties in food quality.
- Understand the microbiological and biochemical fundamentals that determine the alteration of foods and the fundamentals of methods of control of these agents (preservation systems).
- Capable of assessing the quality of the main raw materials of animal origin and identifying the technologies used for their handling, conservation and transformation.
- Capable of evaluating the effects that the different technological operations have on the raw materials of animal origin and on the quality parameters of the processed foods.
- Know the principles related to food processing and preservation required to design, implement and supervise food quality and safety management systems in the food industry

Importance of learning outcomes

Students are confronted for the first time with the study of food so the skills that form this subject are relevant to contribute to the training of future graduates in the performance of the professional profile Food Safety, Technology and Quality. This function is one of the most important among those performed by the veterinarian, given its importance from the point of view of Public Health. The adequate development of these functions requires knowing the agents responsible for the alteration of food quality parameters, the strategies used by the food industry to fight against these agents and the procedures used by the food industry for the processing, storage and circulation of animal food products or products of animal origin. It is also essential to know, know how to apply and supervise the mechanisms and procedures of the quality management systems applied in the food industry.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

Food Technology Block (80% final qualification)

- **Written assessment test**: There will be two partial exams. The first, which will be eliminatory of the subject, will be carried out once the didactic units I, II, III and IV and V and VI have been completed and will consist of 60 test questions (90% grade), and 2 questions based on the resolution of practical cases and / or those in practical activities or seminars (10% qualification). The second partial exam that will consist of 15 test questions will be held, coinciding with the final exam and will include teaching units VII and VIII. Students who take the final exam must take both parts while those who have passed the first partial should only perform the second partial. The qualification of the first part will be 80% and the second part 20% of the final qualification of the Food Technology block.

Practicum Block (20% final grade)

Teamwork Preparation, presentation and advocacy of a report on the process of elaboration of the food obtained in the practicum

Assessment criteria and levels of requirement

In order to pass the first partial examination and eliminate the subject, it will be necessary to obtain a minimum score of 6 out of 10 in each of the three tests of which it consists (multiple-choice questions, short answer questions and questions on practical assumptions). In the global examination, a minimum score of 4 out of 10 must be obtained in

each activity and the weighted average of the four tests must be equal to or greater than 5.

In the multiple-choice questions, 0.25 points will be subtracted for each wrong answer. Clarity and conciseness in short question answers, resolution of practical cases and the elaboration of the report of the practical work and oral presentation will be assessed. The grades of the tests passed throughout the course will be kept during the rest of the seasons of the corresponding academic year. In the final assessment of June, if students have not passed the first midterm exam, they will either have to take the first midterm exam or the global assessment.

Methodology, learning tasks, syllabus and resources Methodological overview

Food Technology

This part consists of 100 hours divided in 70 hours for lectures in classroom, 20 hours for laboratory and 10 hours for seminars.

Student will have in advance the contents of the corresponding lectures. Professor will focus his presentation in those aspects harder to understand. Student should have read the material supplied in advance in order to formulate questions to the professor

Laboratory activities will consist in 5 sessions of 4 hours. The main objective of laboratory activities is to show and demonstrate different issues previously explained in the lectures.

Seminars will be attended by smaller number of students that lectures. In this activity practical cases will be presented to be solved by students with the support of the professor and some person working in the food industry will be invited to do a presentation.

Practicum in Food Technology

This part consists in 30 hours (4 h of lectures, 18 h of activities in the pilot plant and 8 hours for the presentation of the work conducted in the pilot plant).

In this part it will be simulate in the pilot plant that students are in a food company and they will have to conduct all the steps required for elaboration of a specific food: quality control of the raw material, elaboration of the foods, control of the final products. These activities will be conducted in coordination with the curse: Hygiene, inspection and food control? and it will be also developing the good hygienic practices for the corresponding food elaborated during this activity.

Learning tasks

Syllabus

UNIT I.- INTRODUCTION (2H)

Lesson1. Introduction. Food Technology in Veterinary degree. Activities of a veterinarian in the food industry. Course objectives, teaching methodology, contents and bibliography.

Lesson 2. Food Science and Technology. Origin, objectives and historic evolution. Current situation and future prospects.

UNIT II.- QUALITY PARAMETERS AND FOOD COMPONENTS (8H)

Lesson 3. Quality parameters of foods. Food definition. Nutritional properties: Energy supplied by foods, essential nutrients. Sensory properties: texture, colour, flavour, Sensory analysis. Food safety: Abiotic and biotic agents. Shelf-life and caducity.

Lesson 4. Water. Content and distribution of water in foods. Physical and chemical properties. Water interactions with foods. Water activity concept.

Lesson 5. Carbohydrates. Content and distribution of carbohydrates in foods. Monosaccharides and oligosaccharides: properties. Polysaccharides: main polysaccharides in foods, functional properties.

Lesson 6. Lipids. Content and distribution of lipids in foods. Sensory, nutritional and functional properties of lipids.

Lesson 7. Proteins. Content and distribution of proteins in foods. Sensory, nutritional and functional properties of proteins. **Lesson 8. Vitamins y minerals.** Content and distribution in foods. Losses of vitamins and minerals during food processing. **Lesson 9. Disperse systems.** Importance of the physical structure in food properties. Disperse systems: gels, emulsions y

foams.

Lesson 10. Additives. Definition. Classification. Properties of the main groups of food additives. Applications.

UNIT III. FOOD SPOILING (5H)

Lesson 11. Physical and chemical agents. Physical agents. Chemical reactions. Lipid oxidation: factors affecting velocity of lipid oxidations. Non-enzymatic browning: factors affecting velocity of non-enzymatic browning.

Lesson 12. Biotic agents I: Enzymes. Endogenous enzymes. Microbial enzymes. Factors affecting enzymatic spoiling.

Lesson 13. Biotic agents II: microorganisms. Microbial contamination of foods. Factors affecting grown and survival of microorganisms in foods. Microbial groups: Pathogenic microorganism, spoiling microorganisms.

UNIT IV. FOOD PRESERVATION (19H)

Lesson 14. Main strategies for food preservation. Preservation by eliminating microorganisms from foods. Preservation by reducing microbial activity and enzymatic reactions. Preservation by microbial and enzymatic inactivation.

Lesson 15. Food preservation by low temperatures: principles. Introduction. Effect of low temperatures on food properties. Effect of low temperatures on microorganisms, enzymes and chemical reactions. Cold generation systems.

Lesson 16. Refrigeration. Introduction. Applications of the refrigeration in the food industry. Control parameters in cold storage. Refrigerated warehouse and transportation at low temperatures.

Lesson 17. Freezing. Introduction. Ice crystals formation, nucleation and crystal growth. Freezing curve. Effect of freezing on food properties, microorganisms and microbial and enzymatic reactions. Frostbite, recrystallization. Frozen storage. Unfreeze.

Lesson 18. Food preservation by atmosphere modification. Vacuum package, controlled atmosphere and modified atmosphere. Properties and characteristics of used gases. Effect on microorganism and food properties. Applications in the food industry.

Lesson 19. Food preservation by reducing water activity: Principles. Introduction. Sorption isotherms. Interactions water/air: Relative humidity in equilibrium. Psychrometric chart. Procedures to measure water activity. Influence of water activity on microbial growth, enzymatic reactions and chemical reactions.

Lesson 20. Dehydration and lyophilisation. Dehydration: Kinetics and mechanism. Effect of dehydration on food properties. Changes in dehydrated foods. Reconstitution of dehydrated foods. Facilites. Lyophilisation: Principles and parameters affecting food lyophilisation, effect of food properties and alteration of freeze dried goods. Facilities.

Lesson 21. Evaporation and other methods of food concentration. Evaporation: principles and parameters affecting the process. Applications and facilities. Concentration by freezing and using membranes. Osmotic dehydration.

Lesson 22. Food preservatives. Effect of preservatives on microorganisms. Main preservatives and applications. Food preservatives of animal origin: from animals, from plants and from microorganisms. Smoking: composition and properties of smoke. Antioxidants.

Lesson 23. Preservation by low pH and fermentation. Effect of pH on microbial growth, chemical and enzymatic reactions. Decrease of pH in foods: natural and artificial acidification. Fermentation: characteristics of microorganisms used in food fermentations. Types of fermentations: Applications.

Lesson 24. Food preservation by heating: principles. Introduction. Kinetics of microbial and enzymatic inactivation by heat. Survival curve. D_t value. Thermodestrution curve: Z value. Factors affecting microbial and enzymatic resistance to heat. Microorganisms and enzymes of interest in food preservation by heating

Lesson 25. Fitting a heat treatment. Risk concept: commercial risk and sanitary risk. Botulinum cook. TDT curve: Ftz value. Effect of heat on sensory and nutritional value of foods: Ctz value.

Lesson 26. Pasteurization and blanching. Blanching: objectives, application, and facilities. Pasteurization: objectives, application, facilities.

Lesson 27. Sterilization. Sterilization: objectives, application, facilities. Alterations of foods treated by heat.

Lesson 28. New technologies for food preservation. New systems for microbial inactivation: ionizing irradiation, high hydrostatic pressure, pulsed electric fields, light pulses, ultrasound. Food preservation by combined process.

Lesson 29. Food packaging. Principles. Functions of packaging. Materials: paper, cardboard, metal, glass, plastic, mix films, edible films. Types of packages**.** Interaction package-food. Active packaging. Aseptic packaging.

UNIT V. MEAT AND MEAT PRODUCTS (12H)

Lesson 30. The conversion of muscle to meat. Meat composition and nutritional value. Muscle structure and ultra-structure. Rigor Mortis. PSE y DFD meats. Meat aging. Meat Quality Parameters: colour, odour, flavour, texture and water holding capacity.

Lesson 31. Fresh meat technology. Meat categories, dressing and cutting. Fresh meat preservation and commercialization.

Lesson 32. Meat products. introduction, classification. Preservation methods. Microbial and biochemical changes. Additives for meat products.

Lesson 33. Fresh and dry-cured meat products. Production processes and most important alterations.

Lesson 34. Cooked meat products. Production processes and most important alterations.

Lesson 35. Dry-cured products. Dry-ham elaboration processes and most important alterations. Other dry-cured products.

UNIT VI FISH, FISH PRODUCTS, FISH EGGS, EGGS AND EGGS-PRODUCTS. (7H)

Lesson 36. Fish composition, structure and post-mortem changes: Introduction. Composition and nutritional value of fish. Classification of fish. Fish muscle structure. Post-mortem changes of fish. Freshness assessment of fish. Influence of fishing methods and refrigeration systems on fish quality. Most consumed species.

Lesson 37. Fish processing and preservation. Preservation methods: refrigeration, freezing, drying, salting, smoking, marinating, canning. Fresh processing of the most consumed fish species. Frozen fish: hake, cephalopods, crustaceans. Salted fish: cod. Canned fish: sardines and tuna. Semi preserved products: anchovies. Surimi and surimi based products.

Lesson 38. Technology of eggs and egg products. Introduction. Formation and structure. Chemical composition and nutritive value. Egg microbiology. Egg preservation. Egg products: pasteurization, refrigeration, freezing, concentration and drying.

UNIT VII MILK AND MILK PRODUCTS (12H)

Lesson 39. Properties of milk. Composition, structure and physico-chemical properties of milk. Fat globule: structure and composition, Milk carbohydrates: lactose. Casein micelles: composition and structure. Acidic and enzymatic coagulation. Whey proteins. Other constituents: vitamines and minerals. Physico-chemical properties of milk: density, pH acidity, crioscopic point. Dairy microbiology: pathogens and spoiling microorganisms.

Lesson 40. **Liquid milks**. Obtention, handling, transport and milk control in the dairy processing Factory. Preliminary operations. Heat treatment: pasteurized and sterilized milks: technology and effects on milk properties. Concentrated milks: evaporated and condensed milk. Milk poder.

Lesson 41. Fermented milks: yogurt elaboration. Other fermented milks.

Lesson 42. **Cheese**. General cheese types. Cheese manufacture. Acidic and enzymatic coagulation. Draining. Cheese ripening. Processed cheese.

Lesson 43. Cream, butter and ice cream. Cream processing. Butter manufacture and types. Ice cream manufacture.

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UNIT VIII. OTHER ASPECTS RELATED WITH THE FOOD INDUSTRY (5H)

Lesson 44.- Ready to eat foods. Types. Elaboration and preservaton procedures. Problematic of ready to eat foods

Lesson 45.- Catering. Organization of a catering kitchen. Processing of foods by catering.

Lesson 46.- Design of a food industry. Characteristics of the processing area, distribution, auxiliary facilities. Processing control.

Lesson 47.- Water supply and treatment of food waste . Applications of water in the food industry. Water quality. Water purification. Characteristics of wastes of food industry: Biology demand of oxygen, chemical demand of oxygen. Procedures for treating wastes: physical, chemical and biological methods. Le

Laboratory lessons

Lesson 1.- Sensors for controlling food safety and quality. (4 H) Mainsensor used in the food industry: temperature, pH, water activity, relative humidity,

Lesson 2.- Predictive Microbiology. (4 H) Programs and resources of predictive microbiology to predict factors affecting microbial growth and survival

Lesson 3.- Pilot plant for food processing. (4 H) Organization. Identification of the differnt equipments for food preservation and processing.

Lessson 4.-Processing of meat (4 H) Main physico-chemical and microbiología analysis in meat processing.

Less 5.-Milk processing (4 H) Main physico-chemical and microbiología analysis in milk processing.

SEMINARS

Seminar 1.- Thermal processing (4 H)**.** Survival curve, thermodestructin ccurve. Graphicla calculation of Dt and z values. F, parameter and botulinum cook.

Seminar 2.- Case. (2 H)It will be presented a practical issue related with food preservation and students will have to find the solution to the issue using different sources of information (books, internet etc)

Seminar 3 Meat and meat products (2 H) Discussion of a current issue related with the food industry.

Seminar 4 Milk and milk products (2 H)Discussion of a current issue related with the food industry.

Practicum

Activities related with Practicum will be conducted in the Pilot Plant of Food Science and Technology. Small group of students will conduct all the steps related with the elaboration of a specific food. Examples of foods that will be elaborated are: Yogurt, cheese, Curd sausages, chorizo, chistorra.

Course planning and calendar

http://veterinaria.unizar.es/gradovet/horarios1.php?COD_TITULACION=6

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28439

Universidad Zaragoza

Year : 2018/19

28440 - Food Hygiene, Inspection and Control

Syllabus Information

Academic Year: 2019/20

Subject: 28440 - Food Hygiene, Inspection and Control

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 14.0

Year: 5

Semester: Annual

Subject Type: Compulsory

Module: Food Hygiene, Technology and Safety

General information

Aims of the course

This course is included in the Hygiene, Technology and Food Safety module and its general goals are to ensure that students acquire the skills and abilities necessary to apply measures that guarantee the safety of human consumption of food throughout the entire food chain; the course also aims to ensure that students acquire the skills necessary to carry out the inspection of food and food industries with special consideration to food traditionally inspected by veterinary professionals (food of animal origin). Another aim is to make students be aware of self-control tools applicable in food companies and the official food control system at any level of food safety management (export, EU, national and regional).

Context and importance of this course in the degree

In the professional context, the skills acquired with this subject constitute one of the classic fields of the veterinary profession. From the point of view of professional development, Directive 2005/36/EC and Royal Decree 1837/2008 and Law 44/2003 on the Regulation of Health Professions establish what knowledge, skills and responsibilities veterinarians acquire in matters of food hygiene, inspection and control.

These professional requirements are reflected in the obligatory competences of the degree that appear in the Order ECI/333/2008 that regulates the requirements of the official university degree of veterinarian. Among others, in an exhaustive way in the mentioned Order, it is identified as a general objective of the veterinary study plans the one that the student acquires general competences on hygiene control, inspection and technology of the production and elaboration of food for human consumption from human production to the consumer as a necessary competence for the formation of an accredited veterinarian in accordance with the directives of the Community Directive. In the same way are identified as general competences related to the subject "knowledge and application of legal, regulatory and administrative provisions in all areas of the veterinary profession of public health and identification of emerging risks in all areas of the veterinary profession".

Recommendations to take this course

In general, for this subject it is advisable to have previously studied basic training subjects programmed in the first year of the Degree. In particular, it is considered convenient that the student has achieved sufficient knowledge of basic subjects such as Microbiology, Parasitology and Toxicology and of applied subjects such as those related to diseases that affect income animals and that can cause zoonoses and other conditions transmitted by food or that serve as a basis for *antemortem* and *postmortem* inspection of butchery animals. Previous knowledge in Epidemiology and Biostatistics, Legal Veterinary and Animal Welfare are also basic. It is advised that students enroll to Food Technology as well when doing first enrollment.

Competences and Learning outcomes

Competences

Student´s competencies after completing the course:

1. Substantiating the fitness for consumption of a food.
2. Identifying the causes of food contamination and alteration.
3. Applying the risk assessment tool in the context of food safety assurance.
4. Applying and implementing hygiene measures throughout the food chain to prevent risks from hazards in the food chain.
5. Establishing self-control plans in the food chain through the use of the Hazard Analysis and Critical Control Points (HACCP) tool.
6. Performing food inspection and establishing an opinion of suitability for consumption.
7. Counseling food business operators on food hygiene and control and on the implementation of traceability plans.
8. Performing *ante*- and *postmortem* inspection of butchery species (mammals, birds and wild game) on the basis of the knowledge acquired and in accordance with what is specified by current legislation.
9. Understanding the systematics of self-control and official control in the food industry.
10. Assessing the quality of food in order to advise, provide and audit commercial and health standards that protect the consumer and prevent fraud.
11. Ability to handle food legislation (Spanish, EU and international), interpreting it and applying it in the hygienic process, in food inspection and control.
12. In-depth knowledge of the principles of Food Safety applicable to the improvement and prevention of Public Health.

In addition, and in connection with other subjects, the student will be more competent to …

13. Intervene in health promotion activities and rational food consumption
14. Advise on communication tasks and training in hygiene and food safety in the company.
15. Identify and assessing the hygiene problems associated with different foods and food industries and propose measures to solve them.
16. Draw up professional opinions on food hygiene, inspection and control.
17. Be capable of applying the knowledge acquired to the analysis of situations, problem solving and decision making in real contexts, through the use of critical reasoning skills (analysis, synthesis and evaluation)

The set of competences set out above are derived from the specific competences of Order ECI/333/2008 which are included in the Hygiene, Technology and Food Safety block for this subject in the Grade verification report and which are set out in the following list:

- Competence HTSA03: Changes, alterations and adulterations that food may undergo
- Competence HTSA04: Sanitary criteria and legal bases for inspection
- Competence HTSA05: Veterinary inspection *ante*- and *postmortem*
- Competence HTSA 06: Inspection of establishments and products
- Competence HTSA07: Good hygiene practices, hazard analysis and critical control points
- Competence HTSA08: Handling and treatments control
- Competition HTSA09: Food Safety and Public Health
- Competence HTSA10: Food risk analysis: risk assessment, risk management and risk communication Competence HTSA11: Investigation of foodborne outbreaks of toxiinfections
- Competence HTSA12: Dynamics and demography of infection and intoxication
- Competence HTSA13: Epidemiology and diagnosis
- Competence HTSA14: Monitoring and surveillance system

The specific competence of the Hygiene, Inspection and Food Control practicum contemplated in the ECI Order is:

• PTTFG01 competence: Pre-professional practices, in the form of a clinical rotary and with a final

evaluation of competencies, in university veterinary hospitals, traveling clinics, farms, pilot plants, departments with devices for practical teaching in the veterinary degree, as well as stays in veterinary establishments, slaughterhouses, companies and organizations of the veterinary or related field.

• Knowledge and practical application of veterinary principles and methodologies, as well as the acquisition of knowledge and skills described in the general objectives of the degree.

Likewise, the development of the subject will allow students to acquire the transversal competences (T01 to T30) indicated in the curriculum document.

Learning outcomes

If students complete the course successfully, they should be able to

1. Recognize the characteristics that bromatologically identify foods in order to substantiate their edibility and fitness for human consumption.
2. Know and identify the causes of food contamination and alteration and to propose measures for their prevention and control.
3. Know the prerequisites and good hygiene practices applicable in the food chain and is able to develop hygiene plans in it.
4. Develop a Hazard Analysis and Critical Control Points (HACCP) model as the basis for the food industry's self-control system.
5. Know the fundamentals of the risk analysis tool through the process of real risk assessment of them, their management and communication, as a fundamental aspect in the process of food safety management, both at the level of the industry and at the level of the Administration.
6. Know how to apply hygienic and sanitary control standards and measures throughout the food chain in order to ensure the production, processing and marketing of food that is safe, nutritious and appealing to the consumer.
7. Understand and know the requirements of food safety, bromatological and commercial value in order to be able to inspect food and establish a judgement of its fitness for human consumption.
8. Know the hygienic requirements of food industries and processes in order to advise the operators of companies or exercise inspection and / or control of them.
9. Perform *ante*- and *postmortem* inspection of butchery species (mammals, birds and wild game) on the basis of the knowledge acquired and in accordance with what is specified by the legislation in force.
10. Assess the quality of food in order to advise, provide and audit trade and health standards that protect the consumer and prevent fraud.
11. Handle food legislation (Spanish, EU and international), interpret it and apply it in the hygienic process, in food inspection and control.
12. In-depth knowledge of the basis of food safety management systems and the principles of Food Safety applicable to the improvement and prevention of Public Health.

Importance of learning outcomes

Hygiene, Inspection and Food Control have as a common goal the knowledge of the measures carried out in the food chain to safeguard the safety of food intended for human consumption; it also intends that students acquire skills to carry out the inspection of food to rule on its suitability for consumption and that he knows the official food control system. The acquisition of skills, based on their learning results, contribute significantly to the performance of the veterinary profession as a guarantor of food safety, both at the level of the company and at the level of the official exercise.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the intended learning outcomes by means of the following types of exams.

1. Written exam (theory).

- Written exams account for 65% of the subject's overall grade (Learning outcomes to be assessed: 1 to 13).
- The midterm exam or global assessment will take place on the dates determined by the Centre and will consist on two type written exam: a) knowledge of basic terms and concepts through specific questions, and b) assessment of the degree of the subject understanding through questions that seek to demonstrate the acquisition of the proposed learning outcomes.

1.1. Midterm written exam.

The midterm examination will be carried out at the end of the teaching of the first four-month period and will evaluate the contents of the subject explained until the end of the first four-month period. This examination will be considered as a qualifying examination for those students who obtain a grade equal to or higher than 6 points out of 10. This grade is saved for the next two sessions of the same academic year.

1.2. Final assessment

The global assessment will evaluate the learning outcomes (1 to 13).

It will include all the subject topics for those students who opt for this modality or for those who have not passed the midterm exam as indicated in 1.1. The minimum grade to pass this exercise will be 5 points out of 10 and will be eliminatory in the same academic year.

For those students who have passed the midterm exam, the global assessment will cover the part of the subject not evaluated. The minimum mark is 4 out of 10 points for the average of the examinations and it will have an eliminatory character in the same academic year.

A fail in two or more modules and/or lack of response to them may mean not passing the subject.

Oral examination assessment modality: students may opt for the modality of oral examination evaluation in the global assessment of the subject; if so they must request it to the coordinating teacher of the subject during the established period. The oral exam will be called in a period close to the date indicated for the celebration of the final written exam and the students will be called in alphabetical order, being able to be present in the exam of their classmates. These students must take the practical exams in the same way as the rest of the enrolled students.

2. Written exam **(practice).**

It will take place in the second four-month period at the end of the practical teaching, on the date determined by the Centre.

The practical knowledge exam accounts for 35% of the subject's overall grade.

The minimum grade to pass this exercise will be 5 points out of 10 corresponding to the average grade obtained in the following evaluation exams:

2.1. Laboratory practices and seminars from subject 1 to 7: (Learning outcomes to be assessed: 1, 2, 3, 4, 7, 8, 10 and 12)

The learning results of practices 1 to 7 will be considered acquired with the attendance and active participation in them, admitting up to a total of 2 absences for justified reasons. In the case of unjustified absences from more than 2 laboratory practices or subject seminars, an evaluation exam will be carried out to verify whether the student has acquired the corresponding competences or not. The contents of the laboratory practices and seminars will be available in the ADD of the subject. The grade to obtain in this evaluation exam will have to be equal or superior to 5 to pass the subject. A few days before the final exam, a list will be published of those students who must take this additional exam, calling them to take it.

Students who for reasons of mobility (Erasmus, Americampus, etc.) have missed more than 2 practical sessions must specify with the coordinating teacher the evaluation system for them.

2.2. Evaluation of external Practices and seminars of practicum in slaughterhouse: (Results of learning to evaluate: 4, 8, 9 and 10).

The evaluation of the external practices carried out in the modality of practicum (practices and seminars of slaughterhouse) will have a value of 15% of the final mark of the subject.

It will consist of a written exam, in the global examination of practical knowledge by means of questions related to the subject matter developed in the practices and slaughterhouse seminars given.

This exam will have eliminatory character in the same academic year for those students who obtain a grade equal or superior to 5.

Attendance and participation in the practicum at the slaughterhouse is compulsory for all students enrolled in the subject, so that the subject will be considered non-evaluable in the case of unjustified absence from the practicum at the slaughterhouse. In this case, an additional exam will be carried out to verify the acquisition of the corresponding competences. The qualification to obtain in this exam will have to be equal or superior to 5 to pass the subject. A few

days before the final exam, a list will be published of those students who must take this additional exam by calling them to take it.

Students who for reasons of mobility (Erasmus, Americampus, etc.) or other causes have justified absences from the practical slaughterhouse sessions must attend the slaughterhouse recovery practices organised in May and take the final practical knowledge exam in the same way as the other students enrolled.

2.3. Evaluation of Practicum in Pilot Plant and practices 8, 9 and 10 (Practical case of self-control based on the HACCP system): (Learning results to evaluate: 3, 4, 5, 6, 12 and 13).

From the activities carried out in the practicum modality that is developed in the Pilot Plant and in practices 8, 9 and 10 of the subject, each group of practices will develop a self-control model based on the HACCP system.

The evaluation of the practical case of self-control based on the HACCP system will have a value of 20% of the final grade of the course, consisting of the following evaluation exams:

- **Oral** exam: will take place on the date scheduled for practice 10 and will consist of the presentation of the self-control model developed. After the presentation, we will proceed to the discussion with the group of the model presented and its group evaluation.
- **Written** exam: individual assessment in the final exam of practical knowledge through questions related to the model developed.

The grade of this exam will be obtained from the average of the oral exam (50%) and the written exam (50%) and to pass it will require a minimum grade of 4 out of 10 in the written exam.

This evaluation will be eliminatory in the same academic year for those students who obtain a grade equal to or higher than 5.

In these exams the ability to solve problems will be evaluated based on the knowledge provided in the practical teaching, the ability to search for, analyse and process information and the ability to reason critically. Approaches that demonstrate a deep and/or conceptual lack of knowledge of the subject will be evaluated negatively.

The unjustified lack of attendance to practical classes, as well as the lack of interest and active participation of the student in the formative activities will be reason for his exclusion from the assigned work group, in which case he will have to develop individually a self-control model based on the HACCP proposed by the teacher and carry out the oral and written evaluation exams in the same way as the rest of the enrolled students.

Students who for reasons of mobility (Erasmus, Americampus, etc.) or other reasons have absences from the practicum sessions in the Pilot Plant and/or the practical sessions 8, 9 and 10 of the subject, for their evaluation, must develop and deliver a model of self-control agreed with the teacher in powerpoint format (50%), and take the final exam of practical knowledge (50%) like the rest of enrolled students.

Those works of evaluation in which evidence of plagiarism is detected will be considered with a grade of fail (0 out of 10).

3. Assessment criteria

3.1. For the final evaluation of the course the following general criteria will be followed:

Student's ability to acquire knowledge, written expression and writing in the written exercises will be assessed; the critical and application capacity of the knowledge acquired will also be assessed. In the practical exams, the student's participation in the same, his critical capacity and the ability to acquire skills related to the subject will be valued.

In both theory and practice evaluations, responses that demonstrate a deep and/or conceptual lack of knowledge of the subject will be evaluated negatively.

3.2. Single global assessment or assessment of non-attendance students

Any student will be able to opt for a unique global evaluation through the realization of a final examination that will understand the demonstration of having acquired the learning objectives and competences of the subject including the practical exams that are considered opportune. This modality also includes those students who opt for non-attendance teaching. The grade to be obtained in each of the exams must be equal to or higher than 5 in order to pass the subject.

However, and given that the specific competences related to *antemortem* and *postmortem* inspection in slaughterhouses must be acquired, those students who opt for non-attendance teaching must justify a minimum stay of 10 hours in slaughterhouses supervised by official veterinarians.

3.3. Final qualification of the subject

The final grade of the subject will be obtained by adding the grade obtained in the written exams (they suppose 65% of the final mark) and practical knowledge exams (they account for 35% of the final mark).

Methodology, learning tasks, syllabus and resources Methodological overview

The learning process of the course is based on theoretical exposition activities by the teacher, joint development of models of self-control and HACCP and laboratory practices to be done in discussion seminars or sessions. The specific practicum of the course is carried out in practical sessions related to the hygiene and the *antemortem* and *postmortem* inspection in slaughterhouses and cutting plants. Also, practical sessions related to the objectives of the course in pilot plant will be developed.

Learning tasks

A total of 90 hours of participatory lectures (9 ECTS) are scheduled.

A total of 30 hours of practice to be coordinated with the specific contents of the course syllabus and related to hygiene, inspection and food control are scheduled by the Centre.

Laboratory practices and seminars consist of ten sessions of 3 hours each, in the labs of Nutrition and Food Science Department of Animal Science and Production Food (Building of Animal Husbandry, street level) and Pilot Plant Science and Food Technology and in computer classrooms and other educational facilities of the Centre. These sessions include: Laboratory practices, seminars, case studies, cooperative work and work presentations.

The Practicum of Hygiene and Food Control Inspection has a content of 2 ECTS with a presentiality 60%, which implies a total of 30 hours of practice teaching. Learning activities include seminars, external practices in slaughterhouses, practices in the Pilot Plant Science and Food Technology and drafting reports.

Likewise, two hours per week are available for every student to develop an individual mentoring with the teachers to solve doubts and questions along the learning process. Moreover, all related to the ADD system would be used for virtual mentoring.

Syllabus

The program that the student is offered to help him achieve the expected results includes the following aspects:

1: Development of lectures

The exhibition part will be developed in a total of 32 lessons divided into two blocks according to the following schedule:

1st Part .- the general concepts of the subject and its objectives are defined, and the basics of prevention and control of food safety, food control and food inspection. This part is constituted by a total of 11 lessons:

Lesson 1.- Concept and content of Hygiene, Inspection and Food Control.

Lesson 2.- Concept and current status of Food Safety

Lesson 3.- Food legislation

Lesson 4.- General aspects of food contamination

Lesson 5.- Food hazard of biological origin.

Lesson 6.- Food hazard of abiotic origin.

Lesson 7.- The Hygiene in the food industry.

Lesson 8.- Tools for evaluation, control and management of food hygiene and safety: prerequisites of hygiene, traceability and HACCP.

Lesson 9.- Sampling, food inspection and official food control procedures

Lesson 10.- The risk analysis of food hazards: assessment, management and communication.

Lesson 11.- Other safety and food hygiene management tools: the precautionary principle, alert and crisis management; food safety objectives; shelf-life.

2nd part .- It consists of specific modules dedicated to Hygiene, Inspection and Food Control of those foods which are direct responsibility in the veterinary profession. The block is divided into modules related to each type of food:

1st Module.- Hygiene, Inspection and Control of Meat and meat products

Lesson 12.- Fitness criteria for meat consumption

Lesson 13.- Hygiene in the meat production

Lesson 14.- Meat traceability

Lesson 15.- Veterinary inspection and official control in meat production

Lesson 16.- Hygiene, inspection and control in the meat processing chain

2nd Module.- Hygiene, Inspection and Control Milk and Dairy Products

Lesson 17. Fitness criteria for drinking milk

Lesson 18. Hygiene in the fresh milk production

Lesson 19.- Food safety management tools and self-control in milk production

Lesson 20.- Inspection and official control in the milk production and processing

Lesson 21.- Hygiene, inspection and control in the dairy products processing chain

3rd Module.- Hygiene, Inspection and Control of fish and fishery products. Idem of Shellfish

Lesson 22. Fitness criteria for seafood consumption

Lesson 23.- Hygiene in the seafood production and placing on the market

Lesson 24.- Official inspection and control of fresh and frozen seafoods

Lesson 25.- Hygiene, inspection and official control of processed seafoods

Lesson 26.- Hygiene, inspection and official control of shellfish

4th Module.- Hygiene, Inspection and Control of eggs and eggs products

Lesson 27.- Fitness criteria of table eggs

Lesson 28.- Hygiene, inspection and official control of consumption eggs

Lesson 29.- Hygiene, inspection and official control of egg products.

5th Module.- Hygiene, Inspection and Control in the RTE. Processing industries prepared foods. Retailers of foods

Lesson 30.- Hygiene, inspection and official control of RTE foods. Food retail outlets. Inspection and official control.

6th Module.- Hygiene, Inspection and Control of other foods subjected to **Veterinary inspection**

Lesson 31.- Hygiene, inspection and official control of preserved and canned foods.

2: Development of practical classes

Practice PL-1 (Cases study).-. Rules governing the exercise of food hygiene, inspection and control. Labelling inspection. Official sampling.

Practice PL-2 (Cases study).- Food legislation searching.

Practice PL-3 (Laboratory).- Control of hygiene in the food industry: surface analysis in the industry. Water control in the food industry.

Practice PL-4 and PL-5 (Laboratory).- Food microbiological analysis: process hygiene criteria and food safety criteria.

Practice PL-6 (Cases study).- Studies of food shelf life. Study of food-borne outbreaks.

Practice PL-7 (Laboratory).- Identification of fish species and fish freshness assessment. Fish inspection. Identification of species of mollusks and crustaceans.

Practice PL-8 and PL-9 (Cases study).- Methodology for the development of a self-control plan (HACCP) in the food industry. Self-control development model.

Practice PL-10 (Work presentation).- Exhibition, discussion and evaluation of the HACCP model in the food industry.

3.-Practicum of the course (2 ECTS)

Slaughterhouse seminars (3 seminars of 3 hours each) tors

Slaughterhouse practices (5 practices to develop in the slaughterhouse Mercazaragoza)

Practice PM1.-Hygiene controls in the slaughterhouse. (3 hours)

Practice PM2.-Operating procedures in the slaughterhouse. *In situ* visit to the Zaragoza slaughterhouse. (2.5 hours)

Seminar SM1.- Performance of official inspections and controls on meat in the slaughterhouse

Seminar SM2.- *Antemortem* and *postmortem* official inspection in the slaughterhouse

Seminar SM3.- Official audits of HACCP-based procedures applied by slaughterhouse opera

Practice PM3.- *Antemortem* and *postmortem* official inspection in the slaughterhouse (3.5 hours)

Practice PM4.- Responsibility of the official veterinarian for animal welfare in the slaughterhouse (3 hours)

Practice PM5.- Case study on the implementation of an official audit of HACCP-based procedures applied by slaughterhouse operators (3 hours)

Practicum in the Pilot Plant Science and Food Technology (2 practices of 3 hours each)

Activities related to these practices will be made in full at the Food Pilot Plant ~~CT~~.

Practices PP1 and PP2.- (6 hours) Design, implementation and maintenance of good hygiene practices and HACCP system in the process of preparing food. Considering the facilities that are available in the pilot plant~~,~~ different food processes related to the main food sectors will be proposed.

Course planning and calendar

Dates classroom sessions will be described in detail together with those of other subjects, along with the rest of subjects of the fifth year in the Degree of Veterinary Medicine, on the website of the Faculty of Veterinary Medicine (https://veterinaria.unizar.es/academico/plan-estudios-grado-veterinaria). This link will be updated at the beginning of each academic year.

Moreover, all ads related to the subject will be introduced in the ADD system in which the subject is developed.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28440

Universidad Zaragoza

Year : 2018/19

28441 - Clinical Practice: Small, Exotic and Equine Animals

Syllabus Information

Academic Year: 2018/19

Subject: 28441 - Clinical Practice: Small, Exotic and Equine Animals

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 8.0

Year: 5

Semester: Annual

Subject Type: Compulsory

Module: ---

General information

Aims of the course

The aim of the course is to enable student to apply, in a real professional context, the knowledge and skills acquired in previous courses with respect to the clinic of the species whose individual pathologies are attended by the veterinarian: equine, dogs and felines and exotics.

Context and importance of this course in the degree

The subject is developed in the context of the last year of the Degree, when the student has already received theoretical and practical clinical training and is prepared to apply it in the clinic. It is the right time to provide, under appropriate supervision, a first clinical and practical experience.

Recommendations to take this course

It is recommended that the student has completed and passed all the pre-clinical subjects of the third year: Pharmacology and Pharmacotherapy, General Surgical Pathology, Surgery and Anesthesiology, Toxicology, General and Propaedeutic Pathology I and II, Diagnostic Imaging, General Pathological Anatomy and Reproduction and Obstetrics.

It is especially advisable that the student has completed and passed the fourth-year Integration subjects related to this Practicum: Integration in companion animals, Equine Integration and Integration in aquatic and exotic animals

Competences and outcomes

Competences

Specific competences of the Veterinary Degree:

- Make use of knowledge and skills in clinical exploration and complementary diagnostic techniques, including diagnostic imaging and necropsies, to the differential diagnosis of the pathological processes of patients of the equine, canine, feline and exotic species.
- Make use of their knowledge and therapeutic skills, pharmacological, surgical or other, for the prevention and treatment of diseases and injuries of equine, canine, feline and exotic species

Transversal competences

- Analysing, synthesizing, solving problems and making decisions in the veterinary clinical field.

- Working as a team, showing respect, appreciation and sensitivity to the work of the others.
- Performing an ethical behaviour in the exercise of their responsibilities towards the profession and society.
- Seeking, managing and communicating information related to the activity of the veterinarian.
- Applying the scientific method in professional practice, including evidence-based medicine.
- Recognising the need to keep the knowledge, skills and attitudes of professional competencies up to date through a process of continuous training.

1. Day One Competences

- 1.1 Understand the ethical and legal responsibilities of the veterinarian in relation to animals under his/her care, the environment, clients, policies and society.
- 1.2 Demonstrate knowledge of the organisation, management and legislation related to a veterinary business economics and employment rights.
- 1.3 Promote, monitor and maintain health and safety in the veterinary setting; demonstrate knowledge of systems of quality assurance; apply principles of risk management to their practice.
- 1.4 Communicate effectively with clients, the public, professional colleagues and responsible authorities, using language appropriate to the audience concerned and in full respect of confidentiality and privacy.
-
- 1.5 Prepare accurate clinical and client records, and case reports when necessary, in a form satisfactory to colleagues and understandable by the public.
- 1.6 Work effectively as a member of a multi-disciplinary team in the delivery of services.
- 1.7 Understand the economic and emotional context in which the veterinary surgeon operates.
- 1.8 Be able to review and evaluate literature and presentations critically.
- 1.9 Understand and apply principles of clinical governance, and practise evidence-based veterinary medicine.
- 1.10 Use their professional capabilities to contribute to the advancement of veterinary knowledge and One Health concept, in order to improve animal health and welfare, the quality of animal care and veterinary public health.
- 1.11 Demonstrate ability to cope with incomplete information, deal with contingencies, and adapt to change.
- 1.12 Demonstrate that they recognise personal and professional limits, and know how to seek professional advice, assistance and support when necessary.
- 1.13 Demonstrate an ability of lifelong learning and a commitment to learning and professional development.

  This includes recording and reflecting on professional experience and taking measures to improve performance and competence.

- 1.14 Take part in self-audit and peer-group review processes in order to improve performance.
- 1.15 Obtain an accurate and relevant history of the individual animal or animal group, and its/their environment.
- 1.16 Handle and restrain animal patients safely and with respect of the animal, and instruct others in helping the veterinarian perform these techniques.
- 1.17 Perform a complete clinical examination and demonstrate ability in clinical decision-making.
- 1.18 Develop appropriate treatment plans and administer treatment in the interests of the animals under their care with regard to the resources available.
- 1.19 Attend in an emergency and perform first aid in common animal species*.
- 1.20 Assess the physical condition, welfare and nutritional status of an animal or group of animals and advise the client on principles of husbandry and feeding.
- 1.21 Collect, preserve and transport samples, select appropriate diagnostic tests, interpret and understand the limitations of the test results.
- 1.22 Communicate clearly and collaborate with referral and diagnostic services, including providing an appropriate history.
- 1.23 Understand the contribution that imaging and other diagnostic techniques can make in achieving a diagnosis. Use basic imaging equipment and carry out an examination effectively as appropriate to the case, in accordance with good health and safety practice and current regulations.
- 1.24 Recognise signs of possible notifiable, reportable and zoonotic diseases as well as abuse and take appropriate action, including notifying the relevant authorities.
- 1.25 Access the appropriate sources of data on licensed medicines.
- 1.26 Prescribe and dispense medicines correctly and responsibly in accordance with legislation and latest guidance.

- 1.27 Report suspected adverse reactions through the appropriate channel.
- 1.28 Apply principles of bio-security correctly.
- 1.29 Perform aseptic procedures appropriately.
- 1.30 Safely perform sedation, and general and regional anaesthesia; implement chemical methods of restraint.
- 1.31 Assess and manage pain.
- 1.32 Recognise when euthanasia is appropriate and perform it with respect of the animal, using an appropriate method, whilst showing sensitivity to the feelings of owners and others, with due regard to the safety of those present; advise on disposal of the carcase.
- 1.33 Perform a systematic gross post-mortem examination, record observations, sample tissues, store and transport them.
- 1.34 Perform ante-mortem inspection of animals destined for the food-chain, including paying attention to welfare aspects; correctly identify conditions affecting the quality and safety of products of animal origin, to exclude those animals whose condition means their products are unsuitable for the food-chain.
- 1.35 Perform inspection of food and feed including post-mortem inspection of food producing animals and inspection in the field of related food technology.
- 1.36 Advise on, and implement, preventive and eradication programmes appropriate to the species and in line with accepted animal health, welfare and public health standards.

Learning outcomes

If the student completes the course successfully, they should be able to:

1. Know how to do the history and clinical exploration of the patients of the canine, feline, equine and main exotic groups.
2. Carry out differential diagnoses that include the most common diseases of dogs, cats, horses and the main exotic species, choosing the necessary complementary diagnostic techniques.
3. Collect and send the most common samples, with their corresponding report. To know how to interpret the results of the basic analytical techniques.
4. Perform and interpret the diagnostic tests by image used in the most frequent pathologies in these species.
5. Perform and interpret the results of the necropsy of these species.
6. Attend emergencies and perform first aid in dogs, cats and horses.
7. Indicate the most common medical and surgical treatments in these species, as well as the necessary hospital care.
8. Anaesthetize and provide analgesia to canine, feline and equine patients.
9. Perform the most common surgical techniques (surgical sterilization in dog/cat) and to know how to perform and help, in the surgical environment.
10. Know how to search and manage clinical information and know how to transmit it to other professionals.

Importance of learning goals

The course does not aim to teach new contents, but to train the student through professional practice, constituting an essential preliminary step for the incorporation into working life of the future clinical veterinarian.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The evaluation will be carried out in blocks, with the following % in the calculation of the final mark:

- Block 1 Internal Medicine and specialities (Small and exotic animals)
  - Written examination 40%
- Block 2 - Surgical Area (Small Animals)
  - Initial evaluation at the beginning of the internship 10%
  - Evaluation at the end of the practical sessions 15
- Block 3 - Emergencies
  - Written examination 4,5% + Written memory 0,5€
- Block 4 - Necropsies
  - Written examination 5%
- Block 5 - Equine
  - Written examination 25%

Block 1 (40%)

The student must present to the Coordinator his/her signature sheet completed by the teachers as proof that he/she has attended and taken advantage of each of the scheduled sessions.
The teacher may ask the student questions that allow him/her to check that he/she has reviewed the basic knowledge in order to make the most of the practice.
Evaluated learning results: 1,2,3,4,5,6, 8 and 11.
Written examination based on clinical cases.

It will take place on the official dates set by the centre in June and September. Learning outcomes assessed: 1,2,3,4,5,6 and 8

Block 2 (25%)

** Initial assessment at the beginning of the internship (10 %)*
On the first day of practice in this block, all students convened on practical theoretical knowledge of basic aspects of surgery and anesthesia will be evaluated. These contents will be available previously in the digital teaching ADD. During the presentation of the subject, they will be told that they should review these contents prior to the practical sessions as part of their personal work and that they will also be evaluated. With this objective, the teacher will carry out a theoretical-practical evaluation that allows him to assess the basic knowledge and skills necessary for the use of the practice. The student will be scored on 10 points out of the 100 that complete the subject.
** Evaluation at the end of the practical sessions (15 %)*
Students will be evaluated during the development of the last practice. Each student will be evaluated by means of a rubric to verify that they have acquired the learning results 9, 10 and 11 listed in section 2.2. of the teaching guide.
The student must obligatorily present to the Coordinator his signature sheet completed by the teachers as proof that he has attended and taken advantage of each of the scheduled sessions.
Evaluated learning results: 9 and 10.

Block 3 (5%)

** Practice report (0.5%)*

The student will make an individual memory of the cases attended during the practice week that will be presented on the last day and assessed by the teacher.
Written examination based on clinical cases (4,5%)

It will be assessed by means of a written examination, which will be 5% of the final mark and which will take place together with the written examination of block 1.
The examination will include clinical cases related to the emergency, ICU and hospitalisation protocols presented at the seminars and which the student will have been able to practise voluntarily on duty shifts.
The student must present to the Coordinator his/her signature sheet completed by the teachers as proof that he/she has attended and taken advantage of each of the scheduled sessions.
Learning outcomes assessed: 7 and 11.

Block 4 (5%)

Block 4 will be evaluated by means of a written exam, which will suppose 5% of the final grade

The examination will consist of cases of necropsies
Learning outcomes assessed: 6

Block 5 (25%)

A theoretical-practical examination consisting on questions about biomodel practices (transrectal palpation in corpses, nerve blocks and major interventions in the head and surgical techniques in extremities). Learning outcomes assessed: 9 and 10.
The student must present to the Coordinator his/her signature sheet completed by the teachers as proof that he/she has attended and taken advantage of each of the scheduled sessions.

Valuation criteria and requirement levels

- 16 points out of 40 for the evaluation of block 1
- 10 points out of 25 for the evaluation of block 2
- 2 points out of 5 of the evaluation of block 3
- 2 points out of 5 of the evaluation of block 4
- 12 points out of 25 in block 5

In case the minimum in any of the blocks is not reached or if the average does not reach 50% of the final grade, the student will keep the grade of the approved blocks throughout the academic year, and should only be examined for suspended activities.
It will be necessary to have attended 90% of the internships. Otherwise, the student will have to take the global test, which will constitute 100% of his final grade. It will be a theoretical and practical global evaluation test in which clinical cases of the different species and specialties object of the subject must be solved.
Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.
0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources Methodological overview

The program offered to students to help achieve the expected results includes the following activities ...

Learning tasks

Syllabus

1. **Dog and cat**. **77 h tutorials (face to face classes) and 15 h individual workload**:

1.1. Clinical Care in medical consultation or surgery (77 hours):

Practical sessions on general medical consultations, medical specialties and operating rooms of the HVUZ:

1.1.1 9 hours in general medical consultation. (3 hours a day for 3 days).

1.1.2 34,5 hours in medical specialties:

Two full weeks, 3 or 4 hours/day by specialty:

Reproduction. 1 day, 4 hours

Dermatology.1 day, 4 hours

Pet Ethology.1 day, 4 hours

Neurology.1 day, 4 hours

Cardiology.1 day 1,5 hours

Endocrinology.1 day 3 hours

Clinical Oncology.1 day, 4 hours

Urology.1 day 4 hours

Ophthalmology.1 day 3 hours

Odontostomatology.1 day 3 hours

1.1.3 32 hours in Operating Room: anesthesia and surgery. 8 days on two weeks (4 days a week), 4 h daily.

During these days, students will actively collaborate in anesthetic and surgical procedures to the extent that the case and the knowledge and skills of the student permit.

1.2. Cardiology Seminar: 1,5 h

1.3. Individual workload (15 h):

Dedicated to the preparation and conduct of examinations.

2. Exotic Animals. 7.5 face to face hours and 5 individual workload:

2.1. Medical care or surgery (7,5 hours):

2.2.2 practice sessions of 3.75 h each, one in HVUZ consultations and other outpatient clinics, with assistant professors. They will complete the weeks of consultation dog / cat.

2.3. Individual workload (5 h): Dedicated to the preparation and conduct of the examination.

3. Emergency, UCI and Hospitalization: 13 hours with tutorship and voluntary activities

Emergency with tutorship:

3.1. Five practical sessions (the first of 3 hours and the remaining four of 2.5 hours), held in the emergency department, ICU and hospitalization of the HVUZ. The clinical cases that go to it will be attended during the time of development of the practices and in the periods in which there are no cases to attend, the following activities will be carried out:

- Introduction to emergencies
- ABC (Airway, Breathing, Circulation)
- Review of clinical cases admitted to the Intensive Care Unit (ICU)
- ICU operation
- Explanation of how patients are monitored and how their hospitalization sheet is carried out and interpreted
- Review of fluid therapy protocols
- Rehydration pattern
- Dose calculation
- How to supplement potassium
- Laboratory operation
- Interpretation of analytics
- Screening
- Ecofast
- CPR drill
- Empathy with the owner: Representation of clinical cases
- Review of how to perform basic sutures using biomodels
- Management of surgical instruments
- Protocol of action in an emergency case that goes with traumatic injury
- The following procedures will be performed on a cadaver
    - Intubation
    - Esophageal tube placement
    - Thoracic drainage tube placement
    - Urine drainage tube placement
    - Placement of peritoneal drainage tube
    - Placement of nasogastric feeding tube
    - How to drain a chest (with clinical case introduction)

- How to perform a puncture to decompress a twisted stomach

- Presentation, discussion and evaluation of students' memories
- Summary of cases of the week. Debate and resolution of possible doubts that may remain pending
- Self-evaluation sheet review (See Annex 1)

Voluntary Activities

3.2. Voluntary clinical assistance during HVUZ guard shifts tutored by HVUZ veterinary staff:

In a week:

- During the afternoon during the week (up to 7h)
- Overnight during the week (up to 30h)
- During the weekend (up to 16h)
- Localizable emergencies for a week

3.3. Assistance to HVUZ during non-school periods

Activity in which the student signs up to collaborate in the emergency support of the HCV during non-school periods.

3.4. Assistance to emergency clinics outside the University of Zaragoza

• Activity in which the student attends up to 8h emergency during the weekend to a concerted external veterinary clinic specialized in Emergency care.

4. Necropsy sessions. 7'5 face to face hours and 5 individual workload:

Clinical sessions in the necropsy room with cases of canine / feline and equine from the HVUZ or referred by other veterinarian species.

They were scheduled with sessions necropsy of other species included in the "Practicum of animals for slaughter?.

5. Horses. 22.5 face to face hours and 15 individual workload:

5.1. Hospital clinical practices: in the area of Large Animal HVUZ.

- 3.5 h with equine patients *
- 8.5 h with biomodels:
- 1.5 h Transrectal examination training in equine cadaver preceded by a preparatory workshop.
- 3.5 h nerve blocks and major surgical interventions in the head **.
- 3.5 h surgical techniques limbs.

5.2. Outpatient practices in equestrian centers or stud farms (7 h) *

Ambulatory clinical equine patients cared for on an outpatient basis with assistant professors with mobile clinics. (Divided into two sessions of 3.5 hours each).

5.3. Seminars about main locomotor pathologies in equine patients (2 h)

5.4. Supervised visits to equestrian centers to analyze real problems and a previous seminar about identification and reproduction (1.5 h).

Appendix 1

SELF APPRAISAL

Emergency practices, hospitalization and ICU

SURNAME NAME:

PRACTICE GROUP:

COURSE DATE:

COMPETITION	YES	NO
1. I know ABC		
2. I am able to understand the hospitalization sheet of an animal		
3. I am able to complete a hospitalization sheet		
4. I know how the ICU works		
5. Select the right fluid for each patient		
6. Calculate a patient's rehydration pattern		
7. I am able to use an infusion pump		
8. I am able to calculate the dose of a drug		
9. I am able to calculate a CRI		
10. I know how to supplement potassium to a patient		
11. I know the basic operation of the laboratory		
12. I am able to interpret analytics		
13. I am able to assess the severity of the urgencies and make a correct screening		
14. I have the guidelines to know how to treat patient owners		
15. I am able to perform basic suture patterns		
16. I know how to handle surgical instruments correctly		
17. I know how to act before a patient with a traumatic injury		
18. I know what ecofast is and how it would be done		
19. I know how CPR is performed		
20. I am able to put an iv path		
21. I know how to intubate a patient		
22. I am able to place an esophageal tube		
23. I am able to place a chest drain tube		
24. I am able to place a urine drain tube		
25. I am able to place a peritoneal drainage tube		
26. I am able to place a nasogastric feeding tube		
27. It would be able to drain a chest		
28. You could perform a puncture to decompress a twisted stomach		

Course planning and calendar

You can see more information in the official FVZ website

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28442

Universidad Zaragoza

Year : 2018/19

28442 - Clinical Practice Production Animals

Syllabus Information

Academic Year: 2018/19
Subject: 28442 - Clinical Practice Production Animals
Faculty / School: 105 -
Degree: 451 - Degree in Veterinary Science
ECTS: 6.0
Year: 5
Semester: Annual
Subject Type: Compulsory
Module: ---

General information

Aims of the course

The general approach of this subject consists in the application of the theoretical-practical knowledge acquired in the subjects of integration of ruminants, pigs-poultry and rabbits. Our students through this learning system will be able to:

1. Manage, evaluate and improve both traditional and more specialized animal production systems.
2. Know the different types of livestock facilities and advising on their options improves to achieve optimal conditions of hygiene and biosecurity, environmental and animal welfare, and reducing the impact on the environment of livestock activities.
3. Carry out or supervise the main animal handling techniques.
4. Know the basis of animal feeding and feed manufacture, the fundamental raw materials in animal feeding, and to be able to formulate rations and evaluate their suitability.
5. Know the reproductive strategies and procedures applied to production, as well as -birth, postpartum and puerperium with their needs, care and associated pathologies.
6. Use the methods of clinical exploration, as well as the procedures of diagnosis of the different pathologies: clinical, pathological or laboratory, as well as their correct interpretation, knowing the etiology of the diseases that affect the - systems of these animal species.
7. Know how to apply the different methods of fighting diseases, both preventive and curative, including medical, surgical or hygienic-dietetic treatments appropriate to each of them.
8. Know the zoonotic diseases and notifiable diseases, with the legal framework that regulate them.
9. Know the particular characteristics of the commercialization of animals and their products.

Context and importance of this course in the degree

The Clinical Practice Production Animals is taught in the fifth course of the Veterinary Degree throughout the ninth and tenth semesters. It includes the practical application in farm of the subjects of Production, Clinic and Health, and it is completed in the Faculty with the postmortem study. It requires the training provided by the Integration subjects included in the 4th year and the basic and preparatory subjects included in the first three Veterinary degree courses.

The learning system is designed to enable students to acquire the competencies, skills and abilities in production, clinical and health that are necessary for their future professional performance with food-producing animals for human consumption. In addition, they will be able to check the connection of veterinarians with the Faculty, since the services of Ruminants Clinic and Pathology (Morphologic Diagnosis) will provide them with the necessary support within the framework of the Clinical Practice Production Animals in those cases that they consider necessary.

Recommendations to take this course

In order to make the most of the knowledge and skills that this subject can provide, it is necessary, although not compulsory, that the student has studied and passed all the pre-clinical subjects in the third year: Pharmacology and Pharmacotherapy, General Surgical Pathology, Surgery and Anaesthesiology, Toxicology, General Pathology and Propedeutics I and II, Diagnostic Imaging, General Pathology and Reproduction and Obstetrics.

It is especially necessary, although not compulsory, that students have passed fourth year Integration subjects related to this Practicum: Integration of Ruminants, Integration of Pigs and Integration of Poultry and Rabbits.

Competences Learning outcomes

Competences

On successful completion of this course, students will be able to:

1. Act in animal farms taking suitable biosecurity measures.
2. Detect and correct structural deficiencies in facilities, inadequate ways of handling animals and their feeding, as well as to apply and assess compliance with animal welfare regulations.
3. Detect sick animals and initiating the diagnostic protocol, being able to follow the appropriate methodology to arrive at a diagnosis by means of clinical examination, necropsies and appropriate sampling, as well as its correct sending to support laboratories in the diagnosis and interpretation of the results.
4. Establish the most appropriate treatment and establish the corrective measures for control and, if possible, elimination of the problem.

In summary, student will demonstrate that it is able to assess the handling, health and welfare conditions of animals under practical conditions in the field, and if there are deficiencies, decide and impose the most appropriate corrective measures.

1. Day One Competences

1.1 Understand the ethical and legal responsibilities of the veterinarian in relation to animals under his/her care, the environment, clients, policies and society.

1.2 Demonstrate knowledge of the organization, management and legislation related to a veterinary business economics and employment rights.

1.3 Promote, monitor and maintain health and safety in the veterinary setting; demonstrate knowledge of systems of quality assurance; apply principles of risk management to their practice.

1.4 Communicate effectively with clients, the public, professional colleagues and responsible authorities, using language appropriate to the audience concerned and in full respect of confidentiality and privacy.

1.5 Prepare accurate clinical and client records, and case reports when necessary, in a form satisfactory to colleagues and understandable by the public.

1.6 Work effectively as a member of a multi-disciplinary team in the delivery of services.

1.7 Understand the economic and emotional context in which the veterinary surgeon operates.

1.8 Be able to review and evaluate literature and presentations critically.

1.9 Understand and apply principles of clinical governance, and practice evidence-based veterinary medicine.

1.10 Use their professional capabilities to contribute to the advancement of veterinary knowledge and One Health concept, in order to improve animal health and welfare, the quality of animal care and veterinary public health.

1.11 Demonstrate ability to cope with incomplete information, deal with contingencies, and adapt to

change.

1.12 Demonstrate that they recognize personal and professional limits, and know how to seek professional advice, assistance and support when necessary.

1.13 Demonstrate an ability of lifelong learning and a commitment to learning and professional development. This includes recording and reflecting on professional experience and taking measures to improve performance and competence.

1.14 Take part in self-audit and peer-group review processes in order to improve performance.

1.15 Obtain an accurate and relevant history of the individual animal or animal group, and its/their environment.

1.16 Handle and restrain animal patients safely and with respect of the animal, and instruct others in helping the veterinarian perform these techniques.

1.17 Perform a complete clinical examination and demonstrate ability in clinical decision-making.

1.18 Develop appropriate treatment plans and administer treatment in the interests of the animals under their care with regard to the resources available.

1.19 Attend in an emergency and perform first aid in common animal species*.

1.20 Assess the physical condition, welfare and nutritional status of an animal or group of animals and advise the client on principles of husbandry and feeding.

1.21 Collect, preserve and transport samples, select appropriate diagnostic tests, interpret and understand the limitations of the test results.

1.22 Communicate clearly and collaborate with referral and diagnostic services, including providing an appropriate history.

1.23 Understand the contribution that imaging and other diagnostic techniques can make in achieving a diagnosis. Use basic imaging equipment and carry out an examination effectively as appropriate to the case, in accordance with good health and safety practice and current regulations.

1.24 Recognize signs of possible notifiable, reportable and zoonotic diseases as well as abuse and take appropriate action, including notifying the relevant authorities.

1.25 Access the appropriate sources of data on licensed medicines.

1.26 Prescribe and dispense medicines correctly and responsibly in accordance with legislation and latest guidance.

1.27 Report suspected adverse reactions through the appropriate channel.

1.28 Apply principles of bio-security correctly.

1.29 Perform aseptic procedures appropriately.

1.30 Safely perform sedation, and general and regional anaesthesia; implement chemical methods of restraint.

1.31 Assess and manage pain.

1.32 Recognize when euthanasia is appropriate and perform it with respect of the animal, using an appropriate method, whilst showing sensitivity to the feelings of owners and others, with due regard to the safety of those present; advise on disposal of the carcass.

1.33 Perform a systematic gross post-mortem examination, record observations, sample tissues, store and transport them.

1.34 Perform ante-mortem inspection of animals destined for the food-chain, including paying attention to welfare aspects; correctly identify conditions affecting the quality and safety of products of animal origin, to exclude those animals whose condition means their products are unsuitable for the food-chain.

1.35 Perform inspection of food and feed including post-mortem inspection of food producing animals and inspection in the field of related food technology.

1.36 Advise on, and implement, preventive and eradication programmes appropriate to the species and in line with accepted animal health, welfare and public health standards.

Learning outcomes

If students complete the course successfully, they should be able to:

1. Get to know the general characteristics of the livestock sectors in Spain, and their situation on a European and world scale. It includes the socio-economic and structural conditions of animal production and the marketing of its products, with reference to the legislative, geographical, economic, health and environmental frameworks.
2. Know production systems and animal handling techniques.
3. Know the characteristics of housing and facilities and their impact on different production systems and animal welfare.
4. Know the various factors that influence the quality of animal products, and is able to determine the causes of problems that may affect it.
5. Know the objectives and criteria of genetic selection, the techniques used in genetic improvement, and their impact on animal health and productivity.
6. Know the main types of feed, pasture and fodder involved in feeding and their use in each production system. Is able to formulate adequate rations to cover the requirements of the animals according to the stage of their productive cycle and production system and to evaluate the adequacy of the ingredients and nutritional levels used in the feeding of the animals.
7. Deal with the diagnosis of the main diseases affecting animals for slaughter, based on knowledge of their - etiology, epidemiology, pathogenesis, clinical symptomatology, and injuries produced. Know how to perform necropsies, choose the samples and request the most appropriate diagnostic techniques for each case and interpret the results.
8. Establish and apply the most appropriate treatment to each pathology and to implement prevention and control measures to prevent the appearance of the most important diseases.
9. Know and understands the reproductive characteristics and mechanisms involved in the birth of production animals, as well as the treatment of problems associated with it, and is able to control and organize the reproductive activity of animals.
10. Take a clinical history and write a veterinary report, as well as communicating with other professionals using correct technical language.
11. Know how to apply methods of technical and economic management and analysis of sustainability in the different livestock farms.

livestock facilities, animal movements, health programs, animal welfare, etc.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the intended learning outcomes through the following assessment activities

1. Compulsory attendance, with active participation, at farm visits and related seminars. Compulsory attendance at all scheduled practical activities of the postmortem section. (Learning outcomes 1-11). Including the seminars corresponding to this postmortem section (Learning outcomes 1-11).
2. Assessment report, carried out by the associated teacher at the end of the internship. In this activity the assimilation of knowledge will be evaluated, as well as the attitude of the student throughout the practices, in which he collaborates with the associate professor in his work as a veterinarian. This report may also be based on the results of objective tests related to what has been observed and learned in the practices (Learning Results 1-11).
3. Report made by the student, individually or in teamwork, on the practices carried out on the farm, or on relevant topics for the professional practice in the different animal species. . In the postmortem section of necropsy, individually or in a group, they will elaborate a macroscopic pathological report of the diagnosed cases during their week of practice. (Learning outcomes 1-11). This report will be evaluated and will form part of the -assessment of this section.
4. The Postmortem Clinical Practice exam consists on a written test that evaluates the diagnostic skills acquired by students. To this end, they will be presented with images and data of the most frequent pathological processes in the pathology of these species and selected cases that have appeared during the course. They must be able to recognise, correctly name the lesions and associate them with a probable -etiology or disease.

Valuation criteria and requirement levels

The following sections and subsections constitute the evaluable parts of the Clinical Practice in supply species. All sections have to be passed individually, and a section or subsection will be considered approved if the score obtained is equal to or exceeds 50% of the maximum possible in that section, except in the Post-mortem Diagnosis section, where the minimum limit will be 60%. This same limit will apply to all 3 subsections of the livestock Practicum -(Ruminants, Pigs, and Poultry and Rabbits). Attendance at all activities of the different sections and subsections of the Clinical Practice is mandatory. Midterm exams are not possible due to the nature of the subject. The final grade will be obtained from the sum of the proportional parts of:

1. **Practicum Livestock 1** (subsection Ruminants) (25% of the total grade)

Grade of attitude, knowledge and participation during the visit, including the resolution of questions or practical activities raised by the teacher (60%) team reports on the visits made, or on relevant issues related to them (40%).

2. Practicum Livestock 2 (Porcine subsection) (16.5% of the total grade)

Grade of attitude, knowledge and participation during the visit (30%), team reports on the visits made, or on relevant issues related to them (45%), clinical case to be resolved in a group (25%).

3. Practicum Livestock 3 (subsection Poultry and Rabbits) (16.5% of the total score)

Grade of attitude, knowledge and participation during the visit (40%), individual reports on the visits carried out, or on relevant topics related to them (30%), individual evaluation on exercises, questions or problems that the teacher may raise during the visits or in seminars (30%).

4. Postmortem Clinical Practice (42% of the total score)

The score will be the result of a written test where images of lesions will be displayed, with a maximum of 32 points. It is compulsory to attend all practical demonstrations (including seminars) in this section of the subject. However, students are encouraged to attend as many diagnostic sessions as possible to complete their training. Students will handle a written report of their practical lessons at the post mortem room. This report will be evaluated by the responsible professor and a maximum of 10 points will be given to this report. These 10 points will be added to the 32 mentioned above to reach 42, the maximum points a student can get in this section of the subject. In case of failure,

the student will need to demonstrate learning outcomes through a global test.

Assessment system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and assessment system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

The evaluation in the second call will be based on the sections and / or subsections failed and on the activities carried out whose result is considered insufficient. Thus, if the failure derives from the evaluation of the presentation of a case, and / or the student's reports, and / or the result of the postmortem diagnostic test, each of the failed parts will have to be repeated, for example, presenting a new case or report, or repeating the postmortem diagnostic test. If the failure derives from non-compliance with the attendance rules, this will directly entail the repetition of the subject in the following course, and in particular of the sections or subsections where the absences have occurred, since there is no possibility of repeating the practices within of the same academic year.

Methodology, learning tasks, syllabus and resources

Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives.

The students are actively involved accompanying veterinary professionals in their work day on farms of various animal species. They will work on both productive and health aspects. In case of detecting interesting clinical problems in any of these visits, affected animals will be included in the section corresponding to the postmortem practicum.

The Practicum of poultry and rabbits presents special difficulties due to the strict conditions of biosafety and confidentiality with which the sector works. For this reason there may be times when it is not possible to ensure a sufficient number of authorized visits to commercial farms; In the event of such a situation, the Faculty plans, as an exceptional case, to transfer part of these practices to its own facilities, ensuring that the associate professor and the postmortem diagnostic teachers will present to the students a sufficiently representative number of clinical and practical cases.

The program of visits of this subject can vary in case of declaration of sanitary emergency.

Learning tasks

Visits to commercial farms of different species: Evaluate the management conditions, health and welfare of the animals; Propose corrective measures; Apply management and diagnostic techniques under the supervision of the teacher.

Seminars for the resolution of doubts from visits, extension of knowledge, or resolution of exercises, clinical cases and postmortem diagnosis.

Individual or team-based works.

Carrying out necropsies and learning the methodology of veterinary pathology diagnosis through the study of clinical cases

Syllabus

Milk cow: 2 visits to the farm, each 3.5 hours.

Beef cattle: 4 hours of visits to various farms, and 2 seminars of 1.5 hours duration.

Sheep: 2 farm visits, 3.5 hours each, and 1 1-hour seminar on health programs

Porcine: 2 visits to different farms of 4 hours each, and 7 hours of seminars aimed at solving doubts, preparation of reports, resolution of clinical cases, and deepening in certain relevant aspects.

Poultry (laying hens and chickens) and Rabbits. In all cases, 3 visits to different farms of 4 hours each, and 2 seminars of 1.5 hours oriented to resolve doubts, prepare reports, solve practical cases, and deepen in certain relevant aspects.

Necropsies: 10 hours per student performing necropsies sent to the Anatomopathological Diagnosis Service of the Faculty of Veterinary Medicine

Pathological Diagnosis: Assistance of a minimum of 20 hours to the discussion of the macroscopic diagnosis of clinical cases referred to the Pathological Diagnosis Service of the Faculty of Veterinary Medicine

Seminars practicum postmortem: 8 one-hour seminars per student.

Course planning and calendar

Activity	Hours
Practicum ruminants	**22**
Practicum porcine	**15**
Practicum poultry and rabbits	**15**
Practicum postmortem	**37,5**

The specific timetable of each group of practices in each of the activities scheduled will be published in advance on the website of the Faculty.

The works or reports requested by the teachers must be delivered as a general rule within one month after the corresponding activity is carried out.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28442

Universidad Zaragoza

Year : 2018/19

28443 - Zoonosis, Preventive Medicine and Health Policy

Syllabus Information

Academic Year: 2018/19

Subject: 28443 - Zoonosis, Preventive Medicine and Health Policy

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 8.0

Year: 5

Semester: First semester

Subject Type: Compulsory

Module: ---

General information

Aims of the course

- Students should visualize, in the context of the biodiversity of existing ecosystems, the wide range of biotic factors that condition the appearance and evolution of epidemic processes that are contagious or transmissible for both animals and the human species.
- Students should be aware of the economic, social and cultural conditions that influence the appearance of the disease and that condition the possibilities of their control and eradication.
- Students should acquire the necessary ability in the handling of sanitary tools, theoretical or methodological, to identify situations of sanitary risk and to react before them by means of strategies of prevention.
- Students should develop the capacity to make decisions, fundamentally of a sanitary nature, in the face of the emergence of animal diseases, with implications for animal health or public health, within the range of existing possibilities for intervention.

Context and importance of this course in the degree

The World Organisation for Animal Health (OIE) makes very clear the role of veterinarians: they are responsible for ensuring the health and welfare of animals, related populations and the ecosystem? Within this responsibility, the implications of animal health on human health makes the veterinary profession a component of the strategy of GLOBAL HEALTH (One World One Health).

The contagious and communicable diseases have a potential of very fast propagation what makes necessary that we must be prepared to anticipate, by means of the PREVENTION, to that risk of propagation, and to react, CONTROL and ERRADICATION, before the evidence of its appearance, since this diffusion can be fatal as much for the animal production of which the supply to the human populations is sustained, as for the public health by the fact that some of these diseases are transmissible to the man himself.

On many occasions, the appearance of some of the diseases that affect animals, and therefore the implementation of control measures, has implications at national or international level and therefore it is necessary to consider legal aspects in these actions. Therefore, the availability of knowledge regarding these legal aspects and how to manage them from a veterinary perspective is another key element that will condition the results of the proposed control measures.

To this situation must be added another aspect that complicates veterinary intervention: the insertion of people into the environment where they interact with domestic and wild animals constitutes an element of sustenance, development, service and affection, but also exposes the human species to contracting pathologies common to both.

These diseases shared by humans and animals are called zoonoses and have been defined by a Joint WHO/FAO Expert Committee as "those diseases that are naturally transmitted from vertebrate animals to humans and vice versa".

More than 200 zoonoses have been described so far.

Zoonoses have, in addition to an economic aspect, an evident impact on human health whose valuation in socio-economic terms is difficult to quantify. This means that the veterinarian, as a health professional, has a special responsibility in the surveillance of all animal diseases that can be transmitted to humans. Therefore, knowing these pathogenic agents their presentation and evolution, in the context of the interaction between animals, humans and the environment, is essential to avoid their EMERGENCY. The knowledge acquired will make it possible to decide on the most appropriate control measures both individually and in the animal community and in the other RISK ELEMENTS that characterise this interaction.

The role of the veterinarian in the face of the appearance of diseases implies the implementation of health actions which, when applied inappropriately, become an obstacle to guaranteeing animal health and public health. This requires veterinarians to be trained to discern the usefulness and disadvantages of each of the health tools available to decide on their use in each case.

Furthermore, when zoonoses are considered, it can be seen that expert reports, endorsed by international bodies such as the WHO or the OIE, advise that for a better and quicker solution to public health problems, it is essential to have highly coordinated health structures and health professionals specialised in the field, who deal with crises in an integrated manner, that is to say, with the participation of all the health professions competent in each of the fields of action (doctors, veterinarians, biologists, nurses, etc.).

For this reason, it is necessary to assume that, in a global world, health has a global perspective in which the veterinary profession must interact with many other professions involved in this global context in order for an effective response to emerge from this interdisciplinarity, where the importance of the One World One Health concept comes into play.

Recommendations to take this course

In order to take this subject, it is recommended that the student has taken all the subjects of the previous courses and especially the subjects corresponding to the integrations of animal species on which the work will be based in the blocks of Preventive Medicine and Zoonosis.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Understand the importance of their intervention in the face of animal population diseases, the possibility of their spread among communities and the risk they pose to public health.
- Respond, through health decisions, to the possible appearance of an outbreak of disease and to understand its implications for human populations.
- Apply the different legal aspects of national and international policy in the face of special actions affecting animals and people related to them and whose objective is the prevention, control or eradication of diseases.

Learning outcomes

Is students complete the course successfully, they should be able to:

- Know the factors that define the emergence and evolution of contagious and communicable diseases in domestic and wild animals and their role in the transmission process between them and the human species.
- Understand the importance of interaction between animals, humans and the environment in the emergence of animal diseases with an impact on animal and public health.
- Know the mechanisms for assessing the risk and impact of disease in a population and its economic, health and ecological implications, both from a spatial and temporal perspective.
- Use the tools that Preventive Medicine provides to act against the risk of the appearance of the disease, or to minimize its impact if it already exists.
- Know the advantages and disadvantages of the use of these tools in animal populations and have the ability to discern when to use them in each pathological context presented.
- Understand and know the legal aspects that condition veterinary intervention when faced with the risk or appearance of diseases from both an animal health and a public health perspective.
- Be familiar with the structure and functioning of veterinary services in Spain and in the context of the European Union, as well as with the functioning of international health organisations.

- Understand the role of the veterinarian and his intervention in the context of global health as a basis for the protection of world populations.

Importance of learning goals

The knowledge obtained constitutes the basis of the training of the health worker responsible for the action in the event of the appearance of a disease with implications both for the productive system and for the people who live with the animals or are supplied with them.

In the same way, some of the knowledge acquired will be basic to understand to what extent the veterinarian will be involved in making health decisions from a purely clinical, environmental, legal or public health perspective.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that has achieved the expected learning outcomes through the following assessment activities

The learning evaluation process will be based, on one hand, on a theoretical exam (60% of the total score, 6 of the 10 total points) and on the other hand, the evaluation of the group activities developed in the different practical sessions with a value of 40% of the total score, (4 of the 10 total points):

1. THEORETICAL EXAM

In the theoretical exam the contents of the complete subject will be assessed, that is, the achievement of learning objectives 1 to 8. Its value is 60% of the total score of the subject.

The exam will be written, it will contain between 10 and 20 short answer questions based on the theoretical concepts presented in class or a case application of the concepts. Each question will have a value of 1 point.

Students must get, at least 40% of the points in this theoretical exam in order to continue with the evaluation (practical activities).

2. EVALUATION OF PRACTICAL ACTIVITIES

Students must complete the portfolio of practical activities developed together with other students working in a groups (official groups generated by the centre). Its value is 40% of the final grade distributed as follows:

2.1. PREVENTIVE MEDICINE AND HEALTH POLICY (MPyPS)

The ELABORATION OF THE POSTER (practical 2) is scored, which is evaluated in its contents by the students themselves and by the teacher in charge. This qualification is completed with the assessment by the teaching staff of the WORK and PRESENTATIONS of the other practices of the block (practice 3,4 and 5).

It is equivalent to 20% of the final grade of the subject.

The poster will be exhibited in a class session where the evaluation will be carried out, an evaluation that will be carried out, on the one hand, by the classmates of other different groups, and on the other hand by the teacher responsible for the activity.

This note will be adjusted to what was observed by the teacher from the operational point of view and the interest shown in the set of the 5 practical sessions that make up this block.

2.2. ZOONOSIS (Z):

Evaluate the achievement of learning objectives 1, 2, 3, 6 and 8.

The elaboration of a TECHNICAL REPORT (pract 6) and the EXHIBITION (pract 7) are punctuated. Both activities will be evaluated by teachers. It constitutes 20% of the final grade of the subject.

This part of the evaluation will be based on assessing the quality of the report, risk analysis carried out, review of the disease (s) with which these risks are explained and the proposals for action and their justification.

It is necessary to have attended the 5 practical sessions of Preventive Medicine and 2 of Zoonosis to be able to pass the subject: Those students who have some practice without performing, must submit to a practical examination of those sessions that have not attended. The exam, which will be written, will consist of solving a case study of the same type as the one in the practice in which it was absent. In it there will be between 3 and 5 short questions (depending on the specific case) where the student must explain specific aspects of the origin of the problem and proposed solutions.

FINAL NOTE: Cumulative grade of the theoretical assessment (6 points) and the two parts of the practical activity (2 points Preventive Medicine and 2 Zoonosis points).

This final grade may be INCREASED with various voluntary activities that are offered to students at the beginning of the course as activities of the XALOC CLUB for preventive medicine. They consist of PRESENTATIONS of health topics in Secondary Education centers, DEBATES development, elaboration and COMICS contest for social information or presentation of cases in TECHNICAL DAYS of Preventive Medicine. Participation is voluntary and each student can sign up to a maximum of two. Each activity carried out increases between 0.5 and 1 point (according to the quality of work) the final grade obtained in the subject (theory and practices).

Methodology, learning tasks, syllabus and resources

Methodological overview

The fact that it is an applicative subject (it uses the concepts and knowledge of other subjects), makes that the whole part of the time we are working with case studies. This tool also allows the development of transversal skills such as leadership, decision making, ability to take decisions or the development of critical thinking.

Learning tasks

The proposed learning activities are presented in the program part of this guide

Subject: **ZONOSES, PREVENTIVE MEDICINE AND HEALTH POLITICS**				
Activity		**Groups**	**Hours/student**	**Description**
1	ZOONOSES THEORY	2	21	General concepts and zoonose types
2	PREVENTIVE M. THEORY	2	35	Preventive medicine and health politics concepts and tools
3	ZOONOSES 1 PRACTICES	6	6	Risk analysis and prevention strategies in public gardens: TÉCHNICAL REPORT
4	ZOONOSES 2 PRACTICES	12	3	Vector borne diseases transmission models
5	PREVENTIVE M. PRACTICES 1	12	3	Diseases outbreak investigation in the farm. Veterinary tools
6	PREVENTIVE M. PRACTICES 2	12	3	Biosecurity in the farm. POSTER
7	PREVENTIVE M. PRACTICES 3	6	3	Control programs at regional level (IBR / BVD)
8	PREVENTIVE M. PRACTICES 4	6	3	Eradication programs at national and international level (FMD, PPC)
19	PREVENTIVE M. PRACTICES 5	12	3	Vaccines and selection of the programs according to the population and objectives

Syllabus

All contents presented and developed activities are supported on material provided through the ADD of the University of Zaragoza. The materials included theoretical documents, multimedia presentations or documents provided by external partners (pharmaceutical laboratories, field specialists ...) and various examples of different case studies. These case studies present real situations that have been adapted to the training process developed specifically for this subject.

The subject is divided in two thematic parts:

Part 1 ZOONOSIS, divided into 3 clusters:

A- Zoonose; general considerations

B- The main zoonose models

C- Zoonose response and Veterinary Public Health.

Part 2 PREVENTIVE MEDICINE AND HEALTH POLITICS, divided into four thematic clusters:

A- Concepts to understand the disease from a Preventive Medicine point of view

B- Main tools for decision making in Preventive Medicine

C-Response strategies in Preventive Medicine

D-Health Politics and health regulations

Course planning and calendar

The distribution of the program and de timetable of every lesson and practices are described in detail in the web site of the Faculty of Veterinary Medicine (link http://veterinaria.unizar.es/gradoveterinaria/) and in the calendar of the ADD. This links will be updated at the beginning of each academic year.

Bibliography and recommended resources

http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28443

Universidad Zaragoza

Year : 2018/19

28444 - Internships

Syllabus Information

Academic Year: 2018/19

Subject: 28444 – Internships

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 451 - Degree in Veterinary Science: 5 107 - Mobility for Degree:

Semester: 107 - Indeterminado 451 - Second semester

Subject Type: External Placements

Module: ---

General information

Aims of the course

the aim of this External Protected Practices course is to achieve the following objectives:

- Contributing to the integral formation of the students, complementing their theoretical and practical learning.
- Facilitating the knowledge of the work methodology that is appropriate to the professional reality in which the students will have to exercise, contrasting and applying the knowledge acquired.
- Fostering the development of technical, methodological, personal and participative competences.
- obtaining a practical experience that facilitates the insertion in the labour market and improves their future employability.
- Fostering the values of innovation, creativity and entrepreneurship.

Context and importance of this course in the degree

This course will allow the student to develop transversal competences and integrate the knowledge and technical skills acquired throughout the degree, to solve practical problems in the veterinary field. Especially the practices will allow the student to apply in a professional environment the acquired knowledge and encourage collaboration with other professionals and teamwork.

Recommendations to take this course

Students have previously studied the basic training subjects, as well as those of the modules of Clinical Sciences and Animal Health, Animal Production or Hygiene, Technology and Food Safety, whose contents may be necessary for the correct performance of the external practices, depending on the entity to which the student is going to be incorporated and the tasks assigned therein.

In any case, the students of the degree will have to have passed a minimum of 150 credits to be able to register for the subject.

It is a mandatory requirement that the student does not have any contractual relationship with the entity in which he or she is going to carry out the internship, unless expressly authorised by the University of Zaragoza.

Competences and Learning outcomes

Competences

On successful completion of this course, students will be able to:

- Elaborate and issuing technical reports related to different profiles of the veterinary profession.
- Apply the acquired knowledge to situation analysis, problem solving and decision making in a professional context.
- Search, analyse and synthesise information on specific topics in the field of veterinary sciences. Define a problem, identify its possible causes and seek solutions.
- Collaborate effectively in working groups. Exercise leadership functions.
- Manage effectively time and handle complex situations.

Learning outcomes

If students complete the course successfully, they should be able to:

- Learn and put into practice what you have learned, performing the tasks entrusted to you with good disposition, autonomy and precision.
- Manage an adequate volume of work, carrying out its functions with a correct rhythm and complying with the indicated deadlines.
- Integrate into a work team and of collaborating and relating appropriately with other colleagues and superiors.
- Listen to opinions and contrast them with their own, negotiating with kindness and efficiency.
- No delays or unjustified absences, respecting the general rules of the institution and with an ethical commitment in the different aspects of professional performance.
- Work with perseverance, enthusiasm and dynamism and have the capacity to adapt to new situations that may arise.
- Write a report of activities in which the objectives achieved and the activities carried out in the corresponding collaborating entity are adequately described.

Importance of learning outcomes

They enable the student to develop numerous professional, social and personal skills, such as: contrasting theoretical and practical knowledge, testing critical and reflective capacity, encouraging decision making, demonstrating perseverance, work capacity, flexibility, negotiation and group work capacity, enthusiasm and vitality, self-confidence, maturity, discipline, autonomy, responsibility...

All of this contributes to the strengthening of the acquisition of the competences of veterinary graduates and to their integral formation.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

There will be two types of evaluation tests:

Test 1. It will consist of the evaluation of the activities developed, according to the training project, in the collaborating entity. The tutor of this Entity will send to the Faculty tutor (academic tutor) an Evaluation Questionnaire facilitated by UNIVERSA that will include several questions for the qualitative evaluation of professional performance aspects, social skills and personal evaluation of the student. In addition, this questionnaire will include a section of evaluation of the practice in terms of numerical grade on a scale of 0 to 10 with one decimal place and which will represent 60% of the overall grade of the student in the subject. Passing this test will accredit the achievement of learning outcomes 1-6.

Test 2. It will consist of the presentation in writing of a final report or report of activities, which the student will elaborate at the conclusion of his internship. The purpose of this report is to reflect:

- the scientific-technical knowledge acquired or extended during the period of completion of the external internship, as well as
- aspects related to the acquisition of skills and abilities for integration into the world of work

The student is free to elaborate the memory, as long as it fulfills the indicated purpose. It is important that the student's report reflects the maturity and professional criteria acquired during the internship. The faculty tutor will guide you in order to include the most relevant information.

Methodology, learning tasks, syllabus and resources Methodological overview

The process of learning is based on:

The development of a stay of at least 135 hours in a collaborating entity, performing the functions assigned to the student and attending the orientation or training sessions considers by the tutor of the entity. Individualized tutorial (tutor belonging to the Veterinary Faculty) will be carried out for orientation. A minimum of two tutoring sessions are estimated: a orientation tutorial must be organized at the beginning of the activity and another one to specify the specific guidelines for the final report. The final report must be developed at the end of the internship and delivered to the assigned academic tutor, as described in the section on Evaluation Activities.

Learning tasks

To achieve the expected results, the course program includes the following activities:

During the first semester of the academic year, there will be a meeting with the students (in which the professor responsible for the subject and the representative of UNIVERSA will be present), where they will be informed of the planning of the subject, including the web page where they can find the list of collaborating entities and the number of students that the companies can host each academic year. If a student establishes contact with another entity that is willing to accept him / her for the development of their practical work, he / she must communicate it to UNIVERSA and to the academic tutor belonging to the Veterinary Faculty, in order to be able to carry out the formalization of the corresponding agreement.

Each practice should contemplate a "Formative Project" in which, among other aspects, the educational objectives and activities to be carried out will be specified. The objectives will be established considering the basic and / or specific competences, as well as those of transversal character that the student must acquire. Likewise, the contents of the practical work will be defined to ensure the competences required.

The "Formative Project" will be completed by UNIVERSA, after agreement with the collaborating entity. The student must complete a "Registration Form", with his personal and academic data as well as a "Application Form" in which the student can indicate in order of preference up to five collaborating entities (companies in the sector, institutions and public entities or private in the national and international scope ... in which they wish to carry out their practices), the reason for their choice and the period of their realization, as well as a "curriculum vitae". The files and the curriculum vitae will be delivered in writing and by e-mail to the contact person of UNIVERSA who collaborates with the Faculty of Veterinary Medicine. In the event that there is a demand greater than that established by a particular collaborating entity, the selection order will be carried out taking into account your curriculum vitae and your academic records, as well as the number of credits passed. The list of the pre-selected students will be sent to the collaborating entity, along with their curriculum, so that the company establishes a priority order of the candidates.

Subsequently, the company or entity assigned and the tutor of the entity, as well as the academic tutor of the Faculty that will be in charge of the monitoring of their practices, will be communicate to the student. In addition, for each practice, UNIVERSA will individually elaborate an "Annex of University Practices" according to the established model, which will be signed by the student and by both tutors, accepting the conditions of the practices to be performed. It will be made 4 copies of the same destined to: UNIVERSA, Academic tutor, Tutor of the entity and the student himself.

The functions of the academic tutor will be:

Contact the tutor in the receiving institution before the beginning of the practices and when it is deemed necessary throughout the practical period

Supervise the student's training and be aware of possible incidents

Advise the student to prepare the report

Receive and consider the evaluation report of the tutor in the institution

Evaluate the final report and fill out the qualification form of the Tutor in the Faculty

Deliver to the Administration Office of the Faculty the two evaluation documents, for the inclusion of the overall rating in the qualification minutes.

The Academic Tutor must be a lecturer teaching in the Veterinary Medicine degree. In case there is a previous agreement between the student and a teacher, he / she may be their tutor. In case there is not, the person in charge of UNIVERSA, with the collaboration of the coordinating of the subject, will assign an academic tutor of an area of knowledge as close as possible to the practical work proposed, trying that there will be a fair distribution among teachers who wish to participate in this activity. In the case of internships carried out within the framework of mobility

programs, national or international, the academic tutor will preferably be the teacher who coordinates the chosen destination.

At the beginning of the internship, students will provide the tutor of the collaborating entity the "Evaluation Questionnaire", to be filled out by the institution's tutor when the training period ends, and to be sent to the academic tutor. The tutor will evaluate the final report and complete an evaluation report of the practical work. Both documents will be delivered by the academic tutor to the Head of academic affairs negotiation of the Center's Administration Office to be introduced in the qualification minutes, following the evaluation criteria previously described.

Syllabus

451 - Grado (MECES 3)

107 - Licenciatura o equivalente

Course planning and calendar

Schedule of practical work, hours of student work.

	Hours of teaching	Hours of student work	T
Practical work	135		1
Meetings		3	3
Tutorials			
Hours of student work for final report		12	1
Total	135	15	1

Bibliography and recommended resources

Universidad Zaragoza

Year : 2018/19

28445 - Undergraduate Dissertation

Syllabus Information

Academic Year: 2018/19

Subject: 28445 - Undergraduate Dissertation

Faculty / School: 105 -

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 332 - .: XX

451 - Degree in Veterinary Science: 5 107 - Mobility for Degree:

Semester: 107 - Indeterminado 332 - Second semester

451 - Second semester

Subject Type: End of Grade Dissertation

Module: ---

General information

Aims of the course

The degree aims to provide society with quality veterinary professionals in any of the profiles of veterinary practice, such as, for example, clinic and production of rental animals, pet clinic, food safety and quality, public health, teaching, research, etc. ... By means of the TFG the student demonstrates to possess the competences acquired throughout the degree, learns to integrate them and to apply them in an autonomous way to deepen in a concrete subject. As far as possible, the development of projects will be encouraged in collaboration with livestock farms, veterinary clinics and companies, as well as in the context of university internships in the various fields of the profession, research contracts, etc., so that the experience gained through the development of the TFG is as realistic as possible. The aim is thus to encourage the acquisition of skills that prepare people for the exercise of professional activity.

The TFG aims to achieve the following objectives:

- Contributing to the integral formation of students by complementing their theoretical and practical learning.
- Facilitating the knowledge of the work methodology appropriate to the professional reality in which the students will have to act, contrasting and applying the acquired knowledge.
- Fostering the development of technical, methodological, personal and participatory skills.

Context and importance of this course in the degree

This is the last subject of the degree. Passing it implies obtaining the Graduate Degree in Veterinary Medicine. This subject offers, therefore, the opportunity to evaluate the degree of acquisition and integration of the skills of the degree by students.
Being the last subject addressed, allows the student to put into practice much of the transversal skills acquired during the degree and integrate their knowledge and technical skills to solve problems of various kinds in the veterinary field. In particular, the TFG allows the student to apply, in a semi-professional environment, the knowledge acquired, encourage collaboration, leadership, creativity, innovation, entrepreneurship and teamwork.

Recommendations to take this course

The TFG is the last subject of studies and can only be defended if all the other subjects of the Degree have been passed. Therefore, the student must have passed or are on the way to passed all subjects of the Degree. At the time of enrolment of this subject, it is essential to be enrolled of the remaining subjects.

In order to carry out practical activities, safety recommendations must be followed, which must be taken into account. Students have all the information available in the following links, as well as in the ADD courses of each of the subjects:

https://veterinaria.unizar.es/estudiantes/formacion-prevencion-riesgos-y-seguridad#normas
https://veterinaria.unizar.es/prevencion/protocolosespecificosveteriaria http://patologiaanimal.unizar.es/medidas-de- security

It is recommended that students check out the resource TOOL GUIDE AND GUIDELINES FOR A GOOD TFG.

Online course -through the Virtual Campus of the UZ- which aims to be a guide that provides information and indications on the characteristics and development of the End of Degree Project (TFG) to students of the University of Zaragoza. The ultimate objective is to achieve a reflection on the TFG by the students in order to help them plan and prepare their corresponding TFG with minimum quality standards. It is open throughout the academic year and has a permanent consultancy service run by librarians from the University of Zaragoza.

Contents of the course:

Step 1. Know the rules that govern your TFG Step 2. Choose the topic

Step 3. Choose your bibliographic reference manager

Step 4. Plan and search for information

Step 5. Evaluate the information found Step 6. Use the information ethically

Step 7. Write the paper

Step 8. Once the work is finished... (upload it to the repository, copyright, etc.)

Competences and Learning outcomes

Competences

The student will have acquired all the competences of the degree, which will allow him/her to develop his/her professional activity as a veterinarian (see section "What you learn" on the website of the Graduate in Veterinary Medicine degree (http://titulaciones.unizar.es/veterinaria/queseaprende.html).

Learning outcomes

If students complete the course, they should be able to:

1. Deal with a subject of veterinary relevance, understands it, develops it and applies the most appropriate strategies to achieve the objectives proposed in your TFG.
2. Perform a TFG of a level demandable to a professional capable of integrating in the labour market in the veterinary field.
3. Draw up a coherent report that includes the chapters indicated in the section of Evaluation of this guide, that fulfils the requirements demanded and that has an adequate level as for presentation, legibility and comprehension.
4. Defend their TFG memory through an oral presentation before a court, adapting to the specific rules and using the usual resources to do so. The student will have to demonstrate capacity to develop a public exposition directed to a scientific forum, in a clear way, with capacity of synthesis of its work and of reasoned discussion in front of the posed questions.

Importance of learning goals

The importance of the subject and the relevance of its results are paramount, since it is a global test that shows the use of the work done by the student throughout the different courses and subjects.

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

The student will develop a written work (or Memory) according to the established requirements and will have to present it orally in public session.

The student will present a report in accordance with the different modalities established by the End of Degree Work Regulations of the University of Zaragoza:

1. Specific academic works, such as bibliographic reviews.
2. Specific work done in the laboratory, field, Veterinary Hospital, Pilot Plant or other facilities that allow the student to develop their activities or acquire their skills.

3. Specific work carried out as a result of internships in companies or institutions, or within the framework of the Practicum subjects of the degrees of the Faculty of Veterinary Medicine.
4. Equivalent works carried out as a result of a stay in another University, through an agreement or mobility program.

Memory must have a minimum length of 25 pages and a maximum of 40 pages, (excluding cover, index). The "Calibri 11" with a spacing of 1.5 will be used as the source. Justified alignment and margins in normal format.

The Defense will consist of the exposition of the end of degree work for a maximum of 15 minutes and the subsequent period of discussion with the court, which will last a maximum of 15 minutes.

This test will be evaluated following the criteria specified in the Valuation criteria section. Passing this test will credit the achievement of learning outcomes. The overall grade of the student will be from 0 to 10 and will be 100% of the overall grade of the student in the subject.

The Report will represent 45% of the overall grade; Defense of work, taking into account both the presentation and the discussion with the court 35% and finally the Director's report 20% of the final grade. To pass this test it will be necessary to obtain a minimum grade of 5.

Valuation criteria and levels of demand

The report that the student will submit in writing must include the following aspects:

1. Cover: In established format
2. Index
3. Summary: in Spanish and English (maximum of 300 words). It will include TFG title in English
4. Introduction (will include the literature review)
5. Justification and Objectives
6. Methodology
7. Results and discussion *
8. Conclusions (in Spanish and English)
9. Personal assessment. Identification of the contributions that, in learning, have involved the completion of this subject
10. Bibliography. Citations and references will be formatted in Harvard BUZ style http://biblioteca.unizar.es/sites/biblioteca.unizar.es/files/documentos/estilo_harvard_resumen_buz_con_rrss.pdf
11. Annexes (only if necessary)

Reasons for exclusion. Failure to comply with one or more of the following criteria will result in the memory not being deposited:

- Deposit of the report or proposal after the deadline established by the Center
- Title of the report other than that indicated in the TFG proposal Extension greater or less than established
- That the Summary and the conclusions are not in Spanish and English

It will be assessed, among others:

1. Ability to analyse, understand and interpret bibliography, material and methods and the results obtained.
2. The capacity for autonomous learning
3. Innovative character and creativity
4. The capacity for synthesis
5. The correct use of the language, both for Spanish and English.
6. Clarity and order in the expression of concepts
7. Formal aspects, especially presentation and defense

For the evaluation of the above mentioned capacities, the Faculty of Veterinary Medicine makes available to the evaluating panel a system of headings that can be found on the website

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree.

0-4,9: FAIL.

5,0-6,9: PASS

7,0-8,9: GOOD (NT).

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose.

Methodology, learning tasks, syllabus and resources

Methodological overview

The methodology followed in this subject is oriented towards achievement of the learning objectives. The student will have to agree with the Director or the Directors of the TFG the formative activities, depending on the proposed subject and modality chosen.

Learning tasks

The subject has been assigned in the curriculum with 6 ECTS (150 hours), invested in:

- Meetings of students with the coordinator of the subject
- Tutorial sessions with the director
- Personal work of the student
- Presentation and defence

Tender lines will be published at the beginning of the academic year. Previous agreements between the student and the director are highly appreciated. The coordinator of the subject and the CGC will ensure that each student has a director before the limit of submission of the proposal

Syllabus

The modalities of TFG will be the following:

- Specific academic work, such as bibliographic reviews.
- Specific work performed in the laboratory, field, Veterinary Hospital, Pilot Plant or other facilities that allow the student to develop their activities or acquire their competencies.
- Specific work done as a result of practices in companies or institutions, or in the framework of the subjects Practicum of the degrees of the Faculty of Veterinary.
- Equivalent work carried out as a result of a stay in another University, through an agreement or mobility program.

Course planning and calendar

The dates and key milestones of the subject will be presented on the website of the Faculty of Veterinary Medicine (link: https://veterinaria.unizar.es/academico/trabajo-fin-de-grado-grado-veterinaria). This link will be updated at the beginning of each academic year.

Bibliography and recommended resources

It will be the student himself who must look for it, oriented by its Director/s and according to the type and theme of the Work End of Degree chosen.