

**Exploratory Methods**

Code: 102677  
ECTS Credits: 9

| Degree                      | Type | Year | Semester |
|-----------------------------|------|------|----------|
| 2502445 Veterinary Medicine | OB   | 2    | 2        |

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

**Contact**

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**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: No  
Some groups entirely in Spanish: No

**Teachers**

Rafaela Cuenca Valera  
Mariano Domingo Álvarez  
Yvonne Espada Gerlach  
Jordi Franch Serracanta  
Ignacio Marco Sánchez  
Alberto Marco Valle  
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Albert Perlas Puente  
Eduard Gascón Bayarri  
Jorge Ramón López Olvera  
Oscar Cabezón Ponsoda  
Rosa Novellas Torroja

**Prerequisites**

It is essential to have completed the first year of degree and have acquired the knowledge of Morphology I, Morphology II, Biochemistry and Animal Management and have learned how to approach animals.

It is highly recommended to be taking Pathology. It is advisable to have adequate knowledge of Physics to understand and know the physical bases of the different image techniques.

## Objectives and Contextualisation

The subject of Exploratory Methods is a second course subject and therefore, it is included in the basic initial subjects of the Veterinary degree. It is essential and essential for later clinical studies. It teaches the bases to elaborate the clinical history and to carry out the handling and the subjection with security of the animals. Also teaches the general and detailed exploration of animals, the collection of samples, their processing and interpretation, the application of imaging techniques in order to obtain the necessary information to be able to issue clinical trials that will be taught in the following courses of degree. Provides the basic methodology to perform an ordered, systematic and complete necropsy of the animal.

The specific objectives are that the student knows:

1. Clinical exploration methods and procedures: collection of clinical symptoms and their interpretation, biological sampling, processing and interpretation
2. The foundations of the different imaging techniques and radiobiology and the interpretation of images
3. The systematic realization of a necropsy

## Competences

- Analyse, synthesise and resolve problems and make decisions.
- Collect, preserve and issue all types of samples with the corresponding report.
- Demonstrate knowledge of English to communicate both orally and in writing in academic and professional contexts.
- Diagnose the most common diseases using different general and instrumental techniques.
- Have basic knowledge of the profession, and in particular of the organisation and functions of professional practice.
- Make clinical records and accurate and complete clinical exploration of animals.
- Perform a necropsy, including a record of the injuries found, sample taking and storage and posterior transport.
- Perform basic analytical techniques and interpret the clinical, biological and chemical results, and interpret the results of tests generated by other laboratories.
- Properly evaluate the nutritional status of animals and know how to advise others on breeding and feeding principles.
- Treat and handle animals in a safe and humanitarian manner, and instruct other people to properly employ these techniques.
- Work effectively in single or multidisciplinary teams and show respect, appreciation and sensitivity for the work of others.

## Learning Outcomes

1. Analyse, synthesise and resolve problems and make decisions.
2. Apply the necropsy technique in accordance with the case to be resolved (necropsies of pets, livestock, wildlife and forensic necropsies).
3. Define and describe clinical trials.
4. Demonstrate knowledge of English to communicate both orally and in writing in academic and professional contexts.
5. Evaluate an animals state of nutrition by means of clinical exploration, and classify the same in pathological cases.
6. Gather a summary of the animal.
7. Identify basic imaging diagnosis techniques and interpret the images obtained (X-ray, echography, NMR, CT, gammagraphy...).
8. Perform analytical techniques on different biological liquids from animals, obtain results and interpret them with regard to the clinical status of the animal.
9. Present a questionnaire to the owner/carer of an animal about its clinical background.
10. Properly perform necropsy of a mammal and a bird and take samples.
11. Recognise the behaviour of each animal species, as well as how it defends itself and examine it without suffering or causing damage.

12. Recognise the current regulations on radioprotection and the correct use of the aforesaid diagnostic technique.
13. Select and manipulate the sample in accordance with the diagnostic test required (blood, urinary and body liquid biopathology, histopathology, microbiology, virology, molecular biology, toxicology...).
14. Work effectively in single or multidisciplinary teams and show respect, appreciation and sensitivity for the work of others.

## Content

The learning process of the contents of the subject is done in an integrated way when attending the theoretical classes and the practical sessions. The subject is structured in four large blocks that are distributed independently each one of them and sometimes overlapping in time.

### BLOCK 1. (Direct Methods)

- Introduction to Clinical Propaedeutics.
- Direct clinical examination methods.
- Complementary methods of clinical examination
- Handling and fastening of animals.
- General exploration of the animal.
- Exploration of the digestive system.
- Exploration of the respiratory system.
- Exploration of the circulatory system.
- Exploration of the urinary tract.
- Exploration of the reproductive system.
- Exploration of the musculoskeletal system.
- Exploration of the nervous system.
- Exploration of the eye and ear structures.

### BLOCK 2. (Biopathology)

- Haematology and blood biochemistry.
- Biopathology of biological liquids.
- Hepatic function tests.
- Pancreatic and gastrointestinal function tests.
- Renal function tests and urine analysis.
- Function tests of the thyroid glands and parathyroid glands.
- Functional tests of the adrenal glands.
- Hydro-electrolytic and acid-base balance.

### BLOCK 3. (Imaging diagnostics)

- Ultrasound: fundamentals of ultrasound interpretation and abdominal ultrasound bases.
- Introduction to Radiology in Small Animals: Foundations of Radiology I.
- Introduction to Radiology in Small Animals: Foundations of Radiology II.
- Radioprotection and radiobiology
- Chest radiation: bases, technique and interpretation of the radiology of the heart and large vessels, pulmonary vascularization, lung, mediastinum and pleural cavity.
- Radiology of the abdomen: bases, technique and interpretation of the radiology of the liver, spleen, gastrointestinal and geno-urinary.
- Bone radiology: Basis of bone radiation, technique and positioning. Bone development; ossification nuclei. Bases of differentiation between inflammation, infection, neoplasia.
- Bases of equine radiology.
- Basis of the radiology of exotic animals.
- Bases of computerized tomography.
- Bases of the magnetic resonance.
- Bases of the scintigraphy.

### BLOCK 4. (Necropsies)

- It is a practical block of necropsy protocols for birds and mammals.

## **Methodology**

A combined teaching methodology will be used, with theoretical teaching as lectures and practical teaching. In this way bases will be given so the students will have to extend with the reading and consultation of the suitable bibliography. The teaching material used in the subject will be available on the Virtual Campus platforms and Moodle classrooms.

Theoretical teaching. Master classes

The lectures will be taught with schematic aids in power point so that the student can follow the explanations. The necessary and basic information will be given so that, afterwards, the knowledge and learning can be completed with the consultation of suitable texts. Each class will begin with a script and with the teaching objectives of the subject.

Theoretical teaching. Flipped class and team-based learning collaborative

The theoretical teaching of the Imaging diagnosis block taught by David Prandi and the theoretical block of Biopatology will follow the flipped class and Team-Based Learning Collaborative (TBLC) systems. The students will have teaching material available before the classroom session, and they will have to prepare it in order to be able to carry out group-learning activities led by the teacher in the classroom.

Practical teaching

The practical sessions serve to apply and determine the knowledge that the students have acquired in the theory. The student will develop the ability to observe and the skill to integrate knowledge.

During the Direct Methods and Image practices, the student has contact and works with live animals. In these practices the student learns to perform a careful physical examination of animals of different species, knowing the appropriate approach measures to avoid injuries, as well as the technique of collecting samples of biological fluids and their analysis (Biopathology), learn to perform and interpret the different image techniques (Image) and finally learns to perform necropsies in corpses (Necropsies).

### *Block 1. Direct methods*

The practical classes will consist, on the one hand, in exploratory sessions in the Exploration Room with three species: horse, cow and dog. Firstly, the basic handling of the different animal species will be taught, as well as the application of the appropriate subjection methods for their exploration. Subsequently, the exploration of the different organs and systems of each one of the species will be taught. On the other hand, a practical session of five hours during one whole morning will be taught the basic handling and exploration of wild animals. The student will have to choose one of the options offered, consisting each one in a visit to a wildlife rescue centre or a field trip.

### *Block 2. Biopathology*

The practices will take place in the laboratory. The first one will teach the operation of a clinical analysis laboratory, with special emphasis on veterinary haematology. In the second, the student will study the normal characteristics of the blood of different animal species from cytology preparations. In the third practice, the student will perform a urinalysis and finally in the fourth, and again through cytology preparations, the student will learn the characteristics of normality of different biological fluids, as well as the alterations observable to the microscope of the most common pathologies of these liquids .

### *Block 3. Imaging diagnosis*

In Imaging practices, ultrasound studies in teaching animals will be carried out, followed by practices at the Hospital Clínico Veterinario (HCV) with real patients who have to undergo imaging tests (ultrasound, radiography, resonance ...). In these practices, the positioning, processing of images, and interpretation with

the description of the images will be learned, as well as an initial approach to differential diagnoses and collection of samples for cytological or histopathological diagnosis.

In the seminars and also in the HCV practice, radioprotection measures will be learned. In the seminars the students will learn, through images and a model artificial horse, how to recognize the normal radiological anatomy of pet animals, horses and exotic animals and some of the most common pathologies.

The practical teaching of the Imaging diagnostic block taught by David Prandi will follow the flipped class and Team-Based Learning Collaborative (TBLC) systems. The students will have teaching material available before the classroom session, and they will have to prepare it in order to be able to carry out group-learning activities led by the teacher in the classroom.

#### *Block 4. Necropsies*

Necropsy practices will teach the correct way to perform necropsies in different domestic species: a monogastric mammal (pig), a polygastric mammal (sheep) and a bird (chicken). In addition to learning the specific technique in each one of the species, the student will learn to evaluate the macroscopic characteristics (form, consistency, color, etc.) of the different organs and tissues of fresh corpses that, in more advanced courses, will serve as a basis to identify macroscopic lesions. Likewise, the student will also learn the sampling methodology for the different laboratory diagnoses after necropsy: histopathology, microbiology, virology and toxicology.

## Activities

| Title   | Hours | ECTS | Learning Outcomes        |
|---|-------|------|--------------------------|
| Type: Directed  |       |      |                          |
| Biopathology Practices  | 8     | 0.32 | 1, 8, 14                 |
| Direct Methods Practices (PCAM wild animals)                      | 5     | 0.2  | 1, 3, 9, 6, 11, 14, 5    |
| Direct Methods Practices (PLABEsp examination with animals)       | 22    | 0.88 | 1, 3, 9, 6, 11, 14, 5    |
| Imaging Practices (PLAB)  | 7.5   | 0.3  | 1, 7, 12, 14             |
| Imaging Practices (PLABEsp ultrasonography with teaching animals) | 1.5   | 0.06 | 1, 7, 14                 |
| Imaging Practices (PLABEspc at FHCV)                              | 15    | 0.6  | 1, 7, 9, 12, 14          |
| Imaging Practices (seminars)                                      | 4     | 0.16 | 1, 12, 14                |
| Master classes  | 36    | 1.44 | 3, 7, 9, 8, 6, 11, 12, 5 |
| Necropsy Practices (PLABEsp)                                      | 12    | 0.48 | 1, 2, 10, 14             |
| Type: Autonomous  |       |      |                          |
| Non-directed work and Study                                       | 110   | 4.4  | 1, 3, 7, 12              |

## Assessment

The evaluation will be developed throughout the course, which will allow to monitor the teaching and learning process, encourage the continuous effort throughout the semester and verify if the competences assigned to the subject in the curriculum.

Theoretical teaching

Evaluation BLOCK 1 (Direct methods). It corresponds to 17% of the total of the final grade of the subject.

The written exams will allow to evaluate the integration of theoretical knowledge with those acquired in the practical sessions of the subject, the ability to relate concepts and analysis and, in short, to show the final maturity of the student.

A written exam will be carried out on the contents of the theoretical classes that will have to be passed to average with the other parts of the subject in order to approve it. The exam will consist of multiple choice test questions, with a single valid answer and four options.

Evaluation BLOCK 2 (Biopathology). It corresponds to 8% of the total of the final grade of the subject.

This block will be evaluated continuously during its teaching.

Evaluation BLOCK 3 (Imaging). It corresponds to 25% of the total of the final grade of the subject.

The written exam will evaluate the ability to integrate the theoretical and practical knowledge acquired by the student. The exam will consist of multiple choice test questions, choice with a single valid answer and four possible options, that will have to be passed to average with the other parts of the subject in order to approve it.

The topics of this block taught by David Prandi will be evaluated continuously during its teaching. The qualification obtained will average with the theoretical examination of the other topics of the block in proportion to the total topics of this block.

Evaluation BLOCK 4(Necropsy).

There is no theoretical examination of this block.

#### Practical teaching

Evaluation BLOCK 1(Direct methods). It corresponds to 20% of the total of the final qualification of the student in this subject.

There will be an individual test. Each student must proof with the real animals that has integrated and achieved the practical knowledge studied. There will be ten questions (four with the dog, three with the horse and three with the cow) that correspond to the objectives, or a part of them, of the practice index. This evaluation must be passed to average with the other parts of the subject.

Evaluation BLOCK 2 (Biopathology). It corresponds to 3% of the final grade of the subject.

A continuous evaluation will be carried out during the practices and a proof of interpretation of images, in the form of a short question writing exam, where the theoretical and practical knowledge acquired by the student will be assessed. This evaluation must be passed to average with the other parts of the subject.

Evaluation BLOCK 3 (Imaging). It corresponds to 20% of the total of the final grade of the subject.

An exam on image interpretation will be done, in the form of a short question writing exam, where the theoretical and practical knowledge acquired by the student will be assessed. This exam represents 85% of the practical evaluation of Block 3. This evaluation must be passed to average with the other parts of the subject. A

continuous assessment will be made during the practices in the FHCV following an established template. Once the theoretical exam and the proof of interpretation of images have been passed separately, the continuous assessment mark (which is 15%) will be taken into account for the final qualification.

The topics of this block taught by David Prandi will be evaluated continuously during its teaching. The qualification obtained will average with the practical examination of the other topics of the block in proportion to the total topics of this block.

#### Evaluation BLOCK 4 (Necropsia)

There will be an evaluation test for the understanding of the theoretical knowledge and a practical test of the technique of necropsy that corresponds to 7% of the final grade of the subject. This evaluation must be passed to average with the other parts of the subject.

#### General rules

Each one of the theoretical and practical exams must be passed separately in order to pass the subject.

Students who do not pass one of the practical or theoretical examinations will have the opportunity to take the exam again during the period of examinations at the end of the semester.

In case of falling the whole subject but having passed some of the blocks, the qualifications of the blocks passed will be preserved only during one academic year. However, the student will have to make the inscription for the whole subject.

### Assessment Activities

| Title  | Weighting | Hours | ECTS | Learning Outcomes               |
|--|-----------|-------|------|---------------------------------|
| Continuous evaluation Block 2 (Biopathology) | 3%        | 0     | 0    | 1, 8, 13, 14                    |
| Continuous evaluation Block 4 (Necropsy)     | 7%        | 0     | 0    | 2, 10, 14                       |
| Practical exam Block 1 (Direct methods)      | 20%       | 0.5   | 0.02 | 1, 3, 4, 9, 8, 6, 11, 13, 14, 5 |
| Practical exam Block 3 (Imaging)             | 20%       | 1     | 0.04 | 1, 3, 4, 7, 9, 12, 14           |
| Written exam (Blocks 1, 2 and 3)             | 50%       | 2.5   | 0.1  | 1, 3, 7, 9, 6, 12               |

### Bibliography

#### BLOCK 1 (Direct Methods)

- Cebrián Yagüe, L. M.; Pastor Meseguer, J.; Ramos Antón, J. J. and Ferrer Mayayo, L. H. (2005). La exploración clínica del ganado vacuno. Servet, Zaragoza.
- Jackson, P. and Cockcroft, P. (2002). Clinical examination of farm animals. Blackwell Science, Oxford.
- McCurnin, D.M. and Poffenbarger, E.M. (1991). Small animal physical diagnosis. W.B. Saunders Company, Philadelphia.
- Pastor, J. (2006). Manual de propedéutica y biopatología clínicas veterinarias. Mira ed., Zaragoza.
- Radostits, O.M., Mayhew, I.G.J. and Houston, D.M. (2002). Examen y diagnóstico clínico en Veterinaria. W.B. Saunders, Philadelphia.

#### BLOCK 2 (Biopathology)

- Bush, B. M. Interpretation of Laboratory Results for Small Animal Clinicians. (1992). Blackwell Scientific Publications, London.
- Cerón, J. J. et al. Veterinary Clinical Pathology. An integrated undergraduate course. (2007). Compobell, S. L. Murcia. España.
- Cowell, R. L. et al. Diagnostic Cytology and Hematology of the Dog and Cat. (2007). 3rd ed. Mosby
- Meyer, D. and Harvey, J. W. Veterinary Laboratory Medicine. Interpretation and Diagnosis. (2004). 3rd edition.
- Raskin, R. E. and Meyer. Canine and Feline Cytology: A Color Atlas and Interpretation Guide. (2016). 3<sup>rd</sup> ed. Elsevier. Schalm's Veterinary Hematology. (2010). 6th ed. Douglas J. Weiss and K. Jane Wardrop (editors). Wiley-Blackwell.
- Stockham, S. L. and Scott, M.A. Fundamentals of Veterinary Clinical Pathology. (2008). 2nd ed. Wiley-Blackwell.
- Villiers, E. and Blackwood, L. Manual de Diagnóstico de Laboratorio en Pequeños Animales. BSAVA. (2007). Ed. S. Barcelona.
- Weiss, D. J. and Wardrop, K. J. Schalm's Veterinary Hematology. 6th edition. (2010). Wiley-Blackwell.
- Willard, M. D. and Tvedten, H. (2012). Small Animal Clinical Diagnosis by Laboratory Methods, 5<sup>th</sup> ed. Saunders.

### BLOCK 3 (Imaging)

- Agut A. Diagnóstico por imagen en pequeños animales. Multimèdica Ediciones Veterinarias, Barcelona, 2014
- Barr F, Gaschen L. BSAVA Manual of canine and feline ultrasonography. BSAVA Gloucester, 2011
- Burk, R.L. Small animal radiology and ultrasonography: a diagnostic atlas and text. St. Louis, Saunders, 2003
- Capello V, Angela M. Lennox ; with William R. Widmer. Clinical radiology of exotic companion mammals / Ames, Iowa. Wiley-Blackwell, 2008
- Dennis R. et al. Handbook of small animal radiology and ultrasound [Recurs electrònic] : techniques and differential diagnoses 2010
- Holloway A, McConnell JF BSAVA Manual of canine and feline radiography and radiology. BSAVA Gloucester, 2013
- Kealy, J.K.: Diagnostic radiology and ultrasonography of the dog and cat. Elsevier. St Louis Mo, 2005
- Nyland TG and John S. Mattoon Small animal diagnostic ultrasound [Recurs electrònic] 3rd ed. Philadelphia. WB Saunders, 2015
- O'Brien, R.T. Thoracic radiology for the small animal practitioner. Teton NewMedia, cop. 2001
- O'Brien, R.T.: Abominal radiology for the small animal practitioner. Made Easy Series. Teton New Media, Jackson, Wyoming, 2002
- Thrall, D.E.: Textbook of veterinary diagnostic radiology. 6th ed. Elsevier Saunders. St Louis Mo, 2013.
- Thrall, D.E. and Robertson, I.D.: Normal radiographic anatomy & anatomic variants in the dog and cat. 2nd ed. Elsevier 2016.

### Webs

The Vet Site <http://vet74.weebly.com/index.html>

Kansas State University website <http://www.vet.ksu.edu/depts/VMTH/radiology/>

UAB Veterinary Radiology website <http://minnie.uab.es/~veteri/21274/webxr/index.htm>

### BLOCK 4. (Necropsies)

- Unitat Docent d'Anatomia patològica-UAB (1998). Necropsia del gos. Videogravació.
- Segalés J. and Domingo M. (2003). La necropsia en el ganado porcino. Diagnóstico anatomopatológico y toma de muestras.
- Marco A. (1995). Necropsia d'un remugant.
- Majó N. (2001). Necropsia d'un au.