1. OVERVIEW

Subject Area	Complementary Clinical Diagnosis I
Degree	Bachelor's Degree in Veterinary Medicine
School/Faculty	Biomedical and Health Sciences
Year	Second
ECTS	6 ECTS
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On-campus
Semester	Second semester

2. INTRODUCTION

The aim of this subject area is to provide students with the basic knowledge of the various techniques and tests that support diagnosis, specifically the fundamentals and limitations of diagnostic imaging techniques (radiology, ultrasound, computed axial tomography [CAT] and magnetic resonance imaging [MRI]), in a comparative manner, and by regions and cavities. We will also study complementary clinical laboratory tests, such as haematology, cytology or clinical biochemistry by examining the profiles of each.

Therefore, this subject area will provide the foundations for acquiring the skills and knowledge needed to select the most appropriate imaging tests for each condition, and a look into the main diseases.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by their acronym in Spanish):

- CB2. Students can apply their knowledge to their work or vocation in a professional manner, and possess the relevant skills which may be demonstrated by forming and justifying opinions, and problem-solving within their study area (Application of Knowledge).
- CB4. Communicating information, ideas, problems and solutions to both specialist and non-specialist audiences (Communication).

Cross-curricular skills (CT, by their acronym in Spanish):

- CT2. Independent learning. Employ appropriate strategies needed to search for, analyse, evaluate and manage information from different sources, and to learn and put into practice what has been learnt independently.
- CT4. Written / oral communication. Communicating and receiving data, ideas, opinions and attitudes in order to ensure understanding and improvement, spoken through words or gestures, or written through words and/or visual elements.
- CT5. Analysis and Problem-solving. Assess information critically, address complex situations by breaking them down into their various parts, identify patterns, and consider other alternatives, approaches and perspectives in order to reach the best solutions and effective arrangements.

General skills (CG, by their acronym in Spanish):

- CG2. Prevent, diagnose and treat animal diseases, particularly zoonoses, both individually and as part of a team.

Specific skills (CE, by their acronym in Spanish):

- CE5. Knowledge and application of:
  a) clinical examination methods and procedures, complementary diagnostic techniques and their interpretation
  b) diagnostic imaging and radiobiology
  d) identification and diagnosis of different kinds of injuries and how they relate to pathological processes
- CE6. Knowledge and application of:
  b) diagnosis

Learning outcomes (RA, by their acronym in Spanish):

- RA1. Describe the basis and limitations of radiology as a method of diagnosis.
- RA2. Describe the basis and limitations of ultrasound as a method of diagnosis.
- RA3. Describe the basis and limitations of CAT and MRI as methods of diagnosis.
- RA4. Interpret the results obtained through the main methods of diagnostic imaging.
- RA5. Interpret the results obtained through the main methods of laboratory diagnosis.
- RA6. Distinguish the different souces of diagnostic information and the most appropriate uses of each.
- RA7. Describe the main kinds of injuries that can be diagnosed using diagnostic imaging or laboratory diagnosis techniques.

The following table shows how the skills developed in the subject area relate to the intended learning outcomes:

Skills (CE)	Learning outcomes (RA, by their acronym in Spanish)
CE5a	RA1, RA2, RA3
CE5b	RA1, RA2, RA3
CE5d	RA4, RA5, RA7
CE6b	RA6

4. CONTENT

- Introduction to Diagnostic Imaging Techniques:
  - Clinical Radiology and Radiation Protection. Contrast Radiology and Fluoroscopy.
  - Clinical Ultrasound, Equipment Settings, and Different Applications.
  - Clinical Computed Axial Tomography and Different Applications.
  - Clinical Magnetic Resonance Imaging and Different Applications.
- Comparative Diagnostic Imaging by Region:
  - Skull and Neck: Anatomy Refresher and Diagnosis by X-ray. Application of X-ray and Ultrasound in the Diagnosis of Head and Neck Conditions. Application of CAT in the Diagnosis of Neurological and Non-Neurological Conditions of the Skull. Application of

MRI vs CAT in the Diagnosis of Neurological and Non-Neurological Conditions of the Skull.

- Thoracic Cavity: Anatomy Refresher and Diagnosis by X-ray. Application of X-ray in the Diagnosis of Cardiac Conditions. Introduction to Echocardiography. Application of Ultrasound in the Diagnosis of Conditions of the Thoracic Cavity. Application of CAT in the Diagnosis of Conditions of the Thoracic Cavity.
- Abdominal Cavity: Anatomy Refresher and Diagnosis by X-ray. Application of X-ray and Ultrasound in the Diagnosis of Urinary Disorders. Application of Ultrasound in the Diagnosis of Digestive Disorders. Application of Ultrasound and X-Ray in the Diagnosis of Lymphatic and Liver Disease. Application of Ultrasound and X-Ray in the Diagnosis of Reproductive Disorders. Application of Ultrasound in the Diagnosis of Conditions of the Abdominal Cavity.
- The Spine: Anatomy Refresher and Diagnosis via Various Techniques.
- Forelimbs: Anatomy Refresher and Diagnosis by X-ray. Application of Ultrasound, CAT and MRI in the Diagnosis of Conditions of the Forelimb.
- Hindlimbs: Anatomy Refresher and Diagnosis by X-ray. Application of Ultrasound, CAT and MRI in the Diagnosis of Conditions of the Hindlimb.

- Correlation with the Major Clinical Laboratory Tests:
  - Haematology.
  - Cytology.
  - Clinical Biochemistry

5. TEACHING/LEARNING METHODS (MD, by their Spanish acronym)

The types of teaching/learning methods are as follows:

- MD1. Lecture / Web conference
- MD2. Case studies
- MD5. Collaborative learning
- MD6. Learning based on workshop/lab teaching
- MD7. Simulation environments
- MD8. Work Placement: Case Studies

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of total hours	Number of hours on campus
AF1. Master lectures	15	15
AF2. Group work (seminars, forums, debates and talks)	4	1
AF3. Case studies and problem-solving	4	2
AF5. Independent working	69	0
AF6. Workshops and/or labs and/or simulation	37	37

AF7. Student work placement	0	0
AF8. Drafting reports or concept maps	5	0
AF9. Research (scientific/case-based)	9	0
AF10. Tutorials	6	3
AF11. Assessment tests	2	2
TOTAL	**151h**	**60h**

7. ASSESSMENT

The assessment methods, plus their weighting in the final grade for the course, are as follows:

On campus:

Assessment system	Weighting
SE1. On-campus theory exams	60%
SE2. Reports and Documents	10%
SE3. Skills and abilities assessment (PRACTICAL)	20%
SE4. Case study/problem	10%

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment tasks, including the deadlines and assessment procedures for each task.
Lab work, synchronous workshops, complex simulations, case studies and theory exams take place on campus and attendance is compulsory.
At the professor's discretion, an oral exam may be arranged to make up for the justified absence of an exam.

8. BIBLIOGRAPHY

- Diagnóstico por imagen en pequeños animales / Amalia Agut Giménez. Agut, A. Barcelona Multimédica Ediciones Veterinarias, 2013 584 páginas: ilustraciones; 29 cm Language: Spanish
- BSAVA Manual of Canine and Feline Radiography and Radiology / editors, Andrew Holloway and Fraser McConnel. Gloucester British Small Animal Veterinary Association, 2016 1 recurso en línea: ilustraciones Language: English
- Veterinary Image-Guided Interventions / edited by Chick Weisse and Allyson Berent. Ames, Iowa State Wiley Blackwell, 2015 1 recurso en línea (683 páginas)
- Handbook of Small Animal Radiology and Ultrasound: Techniques and Differential Diagnoses / Ruth Dennis ... [et al.]. New York Churchill Livingstone/Elsevier, 2010 1 recurso en línea: ilustraciones Language: English
- Radiología clínica de mamíferos exóticos de compañía / Vittorio Capello, Angela M. Lennox; con William R. Widmer. By: Capello, Vittorio. Buenos Aires Inter-Médica, 2010 471 páginas: ilustraciones; 30 cm Language: Spanish
- Practical Small Animal MRI / Patrick R. Gavin, Rodney S. Bagley. By: Gavin, Patrick R. Ames, Iowa State Wiley Blackwell, 2009 1 recurso en línea (X, 362 páginas) : ilustraciones (principalmente color)

- Textbook of Veterinary Diagnostic Radiology / Edited by Donald E. Thrall. Philadelphia W.B. Saunders, 1994 1 recurso en línea Language: English

Other recommendations:

- Veterinary Radiology & Ultrasound. [s. l.]: Wiley-Blackwell, [s. d.]. ISBN 1740-8261