Universitat de Lleida

DEGREE CURRICULUM

INFECTIOUS AND PARASITIC DISEASES DIAGNOSTICS

Coordination: RAMIREZ RIVERO, GUSTAVO ADOLFO

Academic year 2022-23

INFECTIOUS AND PARASITIC DISEASES DIAGNOSTICS 2022-23

Subject's general information

Subject name	INFECTIOUS AND PARASITIC DISEASES DIAGNOSTICS
Code	100361
Semester	1st Q(SEMESTER) CONTINUED EVALUATION
Typology	

Degree	Course	Character	Modality
Double bachelor's degree: Bachelor's Degree in Veterinary Medicine and Bachelor's Degree in Science and Production	5	COMPULSORY	Attendance-based

Course number of credits (ECTS)	6
Type of activity, credits, and groups	

Activity type	PRACLIN	PRALAB	TEORIA
Number of credits	0.5	2.5	3
Number of groups	6	4	1

Coordination	RAMIREZ RIVERO, GUSTAVO ADOLFO
Department	ANIMAL SCIENCE
Teaching load distribution between lectures and independent student work	Attendance hours: 60 Non-attendance (self-work) hours: 90
Important information on data processing	Consult this link for more information.
Language	Spanish (3.6 credits), Catalan (2.4 credits).
Distribution of credits	3 theoretical credits 3 practical credits - Sampling and pathologic diagnosis: 0.9 - Parasitologic diagnosis: 0.3 - Serologicl / microbiologic diagnosis: 0.4 - Molecular diagnosis: 0.4 - Small animal clinical cases: 0.4 - Clinical cases of large animals / production animals: 0.6

INFECTIOUS AND PARASITIC DISEASES DIAGNOSTICS 2022-23

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
BASSOLS WOLF, MARTA	marta.bassols@udl.cat	2	
GASSO GARCIA, DIANA	diana.gasso@udl.cat	1,6	
MARTINEZ LOBO, FRANCISCO JAVIER	javier.martinezlobo@udl.cat	2,4	
NOVELL BADAL, MARIA ELENA	elena.novell@udl.cat	2	
PENA SUBIRA, RAMONA NATACHA	romi.pena@udl.cat	2	Upon request
RAMIREZ RIVERO, GUSTAVO ADOLFO	gustavo.ramirez@udl.cat	6	

Subject's extra information

Multidisciplinary subject oriented to the connection of the basic fonaments of the different techniques and methodologies used in Veterinary Medicine for the diagnosis of infectious diseases. The subject is intended to have a practical profile; however it will be necessary learning about basic theorical concepts, protocols and applications of the different techniques in each case (microbiologic, immunologic, molecular, parasitologic and anatomopathologic diagnosis in different animal species).

This subject complements the practical part of several of the subjects related to Animal Health, including Pathology and Clinical disciplines.

For the correct follow-up of the subject and achievement of knowledge, constant work by the student is recommended.

Learning objectives

OBJECTIVES OF KNOWLEDGE

The student who passes the subject must:

1. Learn the diagnostic method.
2. Apply the diagnostic techniques on diseases with a infectious origin.
3. Use the appropriate nomenclature for each technique.
4. Know the diagnostic techniques in bacteriology, mycology, virology and parasitology.

OBJECTIVES OF CAPACITY

The student who passes the subject must be able of:

1. Make a correct choice among the diagnostic methods available.
2. Perform diagnostic techniques properly on diseases with infectious origin.
3. Interpretation of the results arisen from the different diagnostic techniques.
4. Obtain and conserve properly samples obtained for anatomopathological studies, or bacteriological, virological, parasitic, toxicological or serological tests, based on the findings and presumptive diagnosis.
5. Identification of parasites and other infectious agents, with special interest to the most important pathogens.

Competences

BASIC COMPETENCES:

- CB1 Get knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study
- CB2 Apply their knowledge to their job or vocation in a professional way and possess the competencies that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.
- CB3 Ability to collect and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant issues of a social, scientific or ethical nature
- CB4 Being able to transmit information, ideas, problems and solutions to a specialized and non-specialized audience
- CB5 Know how to develop those learning skills necessary to undertake further studies with a high degree of autonomy

GENERAL COMPETENCES

- CG2 Prevention, diagnosis and individual or collective treatment, as well as fighting against animal diseases, with special emphasis in zoonoses.
- CG5 Knowledge and application of legal, regulatory and administrative provisions in all areas of the veterinary profession and public health, understanding the ethical implications of health in a changing and global context.
- CG6 Development of professional practice with respect to other health professionals, acquiring skills related to teamwork, with the efficient use of resources and in

quality management.
- CG7 Identification of emerging risks in all areas of the veterinary profession

SPECIFIC COMPETENCES

- CE14 Identify and apply the methods and procedures of the diagnostic techniques and their interpretation as well as identify and apply the roles of the Necropsy
- CE15 Identify and apply diagnostic imaging and radiobiology
- CE16. Identify and apply the bases of the diagnosis, of the different types of lesions and their association with pathological processes
- CE22. Know the infectious and parasitic diseases with a veterinary interest, including its diagnosis and fighting; applying the bases of Zoonoses and Public Health
- CE40 Perform basic analytical techniques and interpret their clinical, biological and chemical results, interpret the results of tests generated by other laboratories as well as collect, preserve and send all types of samples with their corresponding report
- CE42 Use radiographic and ultrasonographic equipment, as well as other equipment that can be used as diagnostic means, safely and in accordance with regulations.

TRANSVERSAL COMPETENCES

- CT1 Acquire adequate oral and written comprehension and expression of Catalan and Spanish
- CT2 Acquire significant knowledge of a foreign language, especially English
- CT3 Acquire training in the use of new technologies, including information and communication technologies
- CT4 Acquire basic knowledge of entrepreneurship and professional environments
- CT5 Acquire essential knowledge of scientific thinking

Subject contents

THEORY

BLOCK 1. **Sampling for diagnostic procedures in infectious diseases.** Sampling: how and when. Conservation of samples.

BLOCK 2. **Molecular diagnosis.** Nucleic acids (isolation methods according to origin, DNA / RNA, sample shipping conditions). Experimental design (databases of nucleic acids, databases of hereditary diseases). Diagnosis type (presence / absence, viral load, identification of strains). Amplification techniques (PCR, RT-PCR, qPCR). Diagnosis based on DNA probes or deep sequencing (metagenomics). Examples of practical cases.

BLOCK 3. **Parasitologic diagnosis**. General concepts, parasite-host interactions, zoonosis. Direct methods of detecting parasites. Indirect detection methods. Clinical cases.

BLOCK 4. **Anatomopathologic Diagnosis:** Introduction to the anatomopathologic diagnosis process; fundamentals. Sampling during necropsy and microscopic diagnosis applied to infectious diseases. Recognition of macro- and microscopic morphological patterns of injury; types of inflammation and adaptive responses to infectious injury. Approach oriented to the problem. Conservation and processing of samples. Histochemical stains for the detection of infectious forms. Immunohistochemistry applied to the detection of infectious forms. Other techniques (in situ hybridization, tissue microarrays ....)

BLOCK 5. **Immunologic-serological and microbiologic diagnosis.** Preparation of samples for serology and serology techniques. Obtention, preparation and sending of samples, basic immunological memory, more important serological techniques (Agglutination, Elisa, Immunodiffusion ...). Types and uses of microbiological media, techniques.

BLOCK 6. **Clinical diagnosis** Main techniques for the diagnosis of Infectious diseases in small animals. Sampling: how and when. Conservation of samples. Techniques in the clinics and techniques in the laboratory of reference. Biochemical tests.

PRACTICAL BLOCK

P1. Practice of pathological diagnosis. Necropsy, correct procedures and sampling target to infectious diseases.

P2: Practice of parasitologic diagnosis. Coprology: direct examination and concentration techniques (flotation, sedimentation and migration; Baerman); Mcmaster to quantify and stool culture. Cytological techniques (tricogram, printing, adhesive tape, cotton swabs, brushing and scraping). Interpretation of Leishmania proteinograms and serologies.

P3. Practice of pathological diagnosis. Cutting and processing of the samples; histochemical stains for infectious agents

P4, P5: Molecular diagnostic practices. Molecular diagnosis of PRRSV in pig serum. Molecular diagnosis of Leishmania in dog bone marrow. DNA / RNA extraction. Diagnosis of presence / absence by qPCR and PCR at the end time.

P6, P7: Microbiological and immunological diagnostic practices. Performing serology techniques (ELISA, agglutination ...); preparation and sowing of microbiological cultures.

P8, P9: Pathological diagnostic practices. Histopathology: lesions characteristic of the most common infectious processes.

P10, P11, P12, P13, P14: Theoretical-practical seminars on clinical diagnosis in large and small animals. Main infectious diseases in the daily clinic: Clinical cases. Interpretation of results in different clinical situations.

Methodology

Theory

AIM: to acquire full knowledge in different laboratory procedures available for the diagnosis of different infectious diseases in different domestic species. They will be taught every week during the first semester, through audiovisual media (presentations, videos ...), requesting the participation of the student. In addition, the teacher can expose in the class one or several didactic problems or cases with images.

Practical contents

Aimed to acquisition of necessary knowledge to choose between the different diagnostic techniques in each specific case, knowing what is the basis of this choice, adequacy, the best available procedure and how make the interpretation of the results obtained. This block will be carried out through practices with small groups in the laboratory with specific instruments, or in the classroom where will be dedicated to the discussion of problems cases with audiovisual or computer media, requesting and allowing the participation of the student at all times. The specific contents of each practice are detailed in the section contents of this Teaching Guide.

Other classroom activities (tutorials, evaluation ...).

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Development plan

FIRST SEMESTER COURSE 2018-2019

- **Theory:** 2 sessions of 2 hours / week.
- **Molecular diagnostic laboratory practices**: 2 sessions of 2 hours / group.
- **Laboratory practices Parasitologic diagnosis**: 1 session of 3 hours / group
- **Laboratory practices Serological / microbiological diagnosis:** 2 sessions of 2 hours / group
- **Laboratory practices Anatomopathologic diagnosis: macroscopic pathology and sampling:** 1 session of 3 hours / group.
- **Laboratory practices Anatomopathologic diagnosis: sample and stain processing :** 1 session of 2 hours / group.
- **Seminars Anatomopathologic diagnosis: histopathological injury patterns of infectious diseases:** 1 session of 4 hours / group
- **Practical seminars Clinical diagnosis small animals:** 2 sessions of 2 hours / group
- **Practical seminars Clinical diagnosis large animals:** 3 sessions of 2 hours / group

The schedules of theoretical and practical sessions, groups of practices and seminars, dates of exams and general calendar of the semester will be delivered to each student by the direction of studies / coordination of the degree.

Methodology and development plan of the theory and practical sessions may be altered depending on the current health situation and the measures adopted by the University and / or by the competent health authorities to respond to health emergency situations that may arise during this semester. Please, be aware of changes regarding schedules or classrooms that may come out during this semester to accommodate any changes in the health situation in our area. This notice also applies to changes in the face-to-face or online teaching of activities to respond to health emergencies that may arise during this semester.

RULES OF THE SUBJECT

1. Several of the practices have been designed with a specific number of participants due to space or material restrictions for the development of the same. **No changes of groups or practices are allowed except those that are justified by certificate or participants are exchanged.**
2. **It is required to wear surgical pajamas or overalls/ boilersuit + waterproof boots to access the practices that are performed in the necropsy room. A lab coat is required. If this requirement is not met, students will not be able to access the practice.**
3. In order to be able to comply with the teaching program, punctuality will be appreciated at each of the practical sessions. **A practical session can not be accessed if more than 15 minutes pass from the start time.**
4. **If an attempted copy is detected in any of the exams of the subject, it will proceed to the immediate expulsion.**

Evaluation

For the final score, the results of the different programmed evaluation activities are weighted.

PRACTICAL BLOCK

Attendance to practices is mandatory

Molecular Diagnosis Practices: 10% of the final score. The practices on molecular diagnosis will be evaluated with the test tool on Campus Virtual. It will focus on the experimental design and the interpretation of results from the tasks undertaken in the lab.

Practices of Immunological and Microbiological Diagnosis: 10% of the final score. The practice will be evaluated through the activities scheduled during and at the end of the practice.

Practices of Parasitological Diagnosis: 10% of the final score. The practice will be evaluated at the end of the practice through a short written questionnaire.

Pathological Diagnostic Practices: 10% of the final grade for the course.

- Sampling: it will be evaluated during the practice. Students must meet some objectives set in the practical dossier (virtual campus)
- Sample processing, histological cuts and histological staining for infectious agents: The practice will be evaluated with the virtual campus test tool.
- Histopathological injury patterns of infectious diseases: it will be evaluated during the practice. Students must meet some objectives set in the practical dossier (virtual campus)

Practical seminars on clinical diagnosis of small animals: will be evaluated through attendance and participation in the proposed seminars.

Practical seminars on clinical diagnosis of large animals / production animals: will be evaluated through attendance and participation in the proposed seminars.

The assistance to practical sessions and seminars is mandatory, except for those properly justified cases.

THEORETICAL BLOCK AND CLINICAL CASES

It will be assessed through a written test at the end of the course. It will take 5 points out of 10 to pass. This test will be composed of clinical cases, real or fictitious, on diseases of small animals and large / production animals, which will be scored between 0-10 points each. The test will assess whether the theoretical and practical skills has been acquired in a comprehensive way and whether the student is able to use them in problem solving. The exercises will include the concepts explained and addressed both in the room classes and in the practical seminars.

For those students who pass the practical block, their scores will be valid for two years, as long as the teaching project does not change.

The participatory attitude in the practices, theoretical classes and the realization of activities proposed along the course will be able to represent, at the teacher's discretion, until 1 extra point in the total score of the subject.

The condition of not presented (NP) is reserved for those students who have presented at most to a single test of partial evaluation during the course.

EVALUATION SUMMARY:
The weight of each test in the final grade will be: 30% Theory + 30% clinical cases + 10% Practice. Mol + 10% Pract. Microbiol / Immunol + 10% Pract. Parasitol + 10% Pract. pathol

Bibliography

Pathology

- **ZACHARY JF, McGAVIN MD. Pathological basis of Veterinary Disease. 5th ed. Elsevier-Mosby. 2016.** Available by UdL library: http://www.sciencedirect.com/science/book/9780323357753
- Diagnostic Histochemistry; Edited by Mark R. Wick. ISBN-13: 9780521874106. Cambridge University Press.
- ATLAS DE INMUNOHISTOQUIMICA. I. MARTIN LACAVE; T. GARCIA CABALLERO , 2012. Nº de páginas: 448 págs. Editorial: DIAZ DE SANTOS; CASTELLANO. ISBN: 9788499690131
- http://www.askjpc.org/vspo/
- http://w3.vet.cornell.edu/nst/
- https://www.ncbi.nlm.nih.gov/pubmed

Molecular diagnosis

- **Molecular diagnostic.** Edited by George P. Patrinos, Wilhelm J. Ansorge; Amsterdam ; Boston : Elsevier/Academic Press, 2010; Edición 2nd ed; ISBN 9780123745378. Available by UdL library: [Recurs electrònic] http://www.sciencedirect.com/science/book/9780123745378
- **Diagnostic molecular pathology.** Elsevier Academic Press, 2016; London, ISBN 9780128011577. Available by UdL library: [Recurs electrònic] http://www.sciencedirect.com/science/book/9780128008867

Parasitologic diagnosis

- **Veterinary parasitology** / M.A. Taylor, R.L. Coop, R.L. Wall; Oxford [etc.] : Blackwell, 2007; Edición 3rd ed. ISBN 9781405119641
- http://www.marvin.udl.cat/parasitology/

Clinical diagnosis

- Manual de diagnóstico laboratorial porcino Autor: Joaquim Segalés (coordinador), Jorge Martínez (coordinador); Joaquim Castellà ... [et al.] Publicació/producció: [Zaragoza] : Servet, DL 2013 ISBN: 9788494101403
- Herd health: food animal production medicine; Radostits, O. M. Publicació/producció Philadelphia : W.B. Saunders, cop. 2001 Edición 3rd ed. ISBN 0721676944