

**1. General information****Course:** MOLECULAR BIOLOGY OF VECTOR-PATHOGEN-HOST INTERACTIONS AND VACCINE DEVELOPMENT**Code:** 310055**Type:** ELECTIVE**ECTS credits:** 4.5**Degree:** 2310 - MASTERS DEGREE PROGRAMME IN BASIC AND APPLIED RESEARCH IN HUNTING RESOURCES**Academic year:** 2020-21**Center:** 601 - E.T.S. AGRICULTURAL ENGINEERS AND MOUNTS AB**Group(s):** 20**Year:** 1**Duration:** C2**Main language:** Spanish**Second language:****Use of additional languages:****English Friendly:** Y**Web site:****Bilingual:** N

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2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

This course introduces the student to the scientific research at the molecular level. The aim is to acquire theoretical and practical knowledge on Molecular Biology, Systems Biology (Functional Genomics, interference RNA, Proteomics) and Immunology, applied to the study of the interaction between pathogens, hosts and vectors. Additionally, the possibilities of developing vaccines to avoid the transmission of diseases caused by the complex vector-pathogen-host relationship are analyzed. Works with *Mycobacterium bovis*, *Anaplasma marginale* and *A. phagocytophilum* that have game species as hosts and that affect man and animals will be used as examples.

4. Degree competences achieved in this course**Course competences**

Code	Description
E01	
E03	
E04	
E05	
E06	
G01	
G02	
G03	
G04	
G05	
G06	
G08	
G09	

5. Objectives or Learning Outcomes**Course learning outcomes**

Not established.

Additional outcomes

Competence 1. - To allow students combine concepts in Molecular Biology and acquire the latest knowledge in this field. - To facilitate the correct understanding of Systems Biology and its application to the study of host-vector-pathogen interactions. Competence 2. - Knowing Genetic Engineering and its use in the development of recombinant vaccines. - Understand the principles of immunity and the immune system response to a disease. - Understand the concepts of functional Genomics and Proteomics, the technologies used and their applications in the field of animal and human health and other areas. Competence 3. - To become familiar with Systems Biology applied to the study of bovine tuberculosis in deer and wild boar. - To perceive the development of vaccines as a means to control bovine tuberculosis. Competence 4. - Understand the possibilities of transmission of several diseases caused by bacteria, both in domestic and wild animals and in humans, through ticks infection. - Understand functional genomics and proteomics as powerful and novel tools for the study of infection and transmission of different pathogenic bacteria to both wildlife and humans by ticks. - Analyze the possibilities of developing vaccines to avoid the transmission of diseases caused by the complex vector-pathogen-host relationship. Competence 5. - To learn the work in a research laboratory performing the extraction and characterization of RNA and proteins from tissue samples of different hunting species infected with intracellular bacteria of the genera *Mycobacterium*, *Brucella* and *Anaplasma*. - To know the methodology for the isolation and identification of pathogens. - To apply gene and protein analysis techniques, such as real-time

RT-PCR, electrophoresis and Western-Blot. - To manage the necessary tools for the analysis of the results obtained from the laboratory work. Competence 6. - To know the structure and format of a scientific publication. - To prepare the results of an investigation for dissemination. - To defend in public the conclusions of their work and propose strategies for further analysis.

6. Units / Contents

Unit 1: Introduction to Molecular Biology: from the concept of gene to the genome as a system

Unit 2: Proteomics

Unit 3: Immunology

Unit 4: Molecular characterization of infectious diseases in wild and domestic hosts and applications for disease control

Unit 5: Laboratory practices

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures		0.7	17.5	Y	N	
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities		0.7	17.5	Y	N	
Study and Exam Preparation [OFF-SITE]	Cooperative / Collaborative Learning		1	25	Y	N	
Project or Topic Presentations [ON-SITE]	Individual presentation of projects and reports		0.3	7.5	Y	N	
Analysis of articles and reviews [OFF-SITE]	Reading and Analysis of Reviews and Articles		0.5	12.5	Y	N	
Individual tutoring sessions [ON-SITE]	Guided or supervised work		0.1	2.5	Y	N	
Self-study [OFF-SITE]	Self-study		1.2	30	Y	N	
Total:			4.5	112.5			
Total credits of in-class work: 1.8			Total class time hours: 45				
Total credits of out of class work: 2.7			Total hours of out of class work: 67.5				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Laboratory sessions	50.00%	0.00%	
Assessment of active participation	20.00%	0.00%	
Progress Tests	30.00%	0.00%	
Total:	100.00%	0.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	17.5
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	17.5
Study and Exam Preparation [AUTÓNOMA][Cooperative / Collaborative Learning]	25
Project or Topic Presentations [PRESENCIAL][Individual presentation of projects and reports]	7.5
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	12.5
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	2.5
Self-study [AUTÓNOMA][Self-study]	30
Global activity	
Activities	hours
Self-study [AUTÓNOMA][Self-study]	30
Study and Exam Preparation [AUTÓNOMA][Cooperative / Collaborative Learning]	25
Project or Topic Presentations [PRESENCIAL][Individual presentation of projects and reports]	7.5
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	2.5
Class Attendance (theory) [PRESENCIAL][Lectures]	17.5
Analysis of articles and reviews [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	12.5
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	17.5
Total horas: 112.5	

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
	La bibliografía se basa en artículos científicos sobre temas relacionados con el curso y se proporcionará a los estudiantes a lo largo de los temas.					