



1. General information

Course: ANIMAL REPRODUCTION BIOTECHNOLOGY**Type:** CORE COURSE**Degree:** 402 - UNDERGRADUATE DEGREE PROGRAMME IN BIOTECHNOLOGY**Center:** 601 - E.T.S. AGRICULTURAL ENGINEERS AND MOUNTS AB**Year:** 4**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 60633**ECTS credits:** 6**Academic year:** 2023-24**Group(s):** 10**Duration:** C2**Second language:** English**English Friendly:** Y**Bilingual:** N

Lecturer: OLGA GARCÍA ÁLVAREZ - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
Agrónomos CR/IREC	CIENCIA Y TECNOLOGÍA AGROFORESTAL Y GENÉTICA	926052868	Olga.Garcia@uclm.es	Wednesday from 9:00 to 11:00.
Lecturer: ANA JOSEFA SOLER VALLS - Group(s): 10				
Building/Office	Department	Phone number	Email	Office hours
ETSIAMB	CIENCIA Y TECNOLOGÍA AGROFORESTAL Y GENÉTICA	926052922	anajosefa.soler@uclm.es	Friday from 9:00 to 11:00. Contact us beforehand by email to confirm an appointment.

2. Pre-Requisites

No prerequisites have been established. However, it is convenient to have taken the subjects Cell and Tissue Biology and Animal Physiology in which the concepts necessary to take the subject of Biotechnology of Animal Reproduction are studied.

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

This subject is part of the Applied Biotechnology topic. The following subjects belong to this same theme: Biotechnological processes and products, Forest and environmental biotechnology and Agrifood Biotechnology.

The justification of the subject in the memory of the title indicates that the basic theoretical-practical aspects of assisted reproduction techniques will be addressed and that the skills that the student will acquire will be to know the biotechnological applications of animal reproduction.

4. Degree competences achieved in this course

Course competences

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CE21	Apply the knowledge and the different biotechnological techniques in the forestry, environmental, agri-food and animal reproduction fields, as well as with the quality and safety of agri-food products.
CG01	Organizational and planning skills.
CG02	Capacity for analysis and synthesis.
CG03	Ability to work in multidisciplinary teams collaboratively and with shared responsibility.
CG04	Sensitivity towards environmental issues.
CG05	Ability to apply knowledge in practice.
CT01	Know a second foreign language.
CT02	Know and apply the Information and Communication Technologies.
CT03	Use correct oral and written communication.
CT04	Know the ethical commitment and professional deontology.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Employing bibliographic and informatic tools

Knowing biotechnological applications in different fields: forestry, environmental, agri-food and animal reproduction.

To design and execute basic practical protocols regarding biotechnological and primary production processes.

6. Units / Contents

Unit 1: Introduction to animal biotechnology.

Unit 2: Collection, processing and analysis of the quality of gametes.

Unit 3: Intracytoplasmic injection.

Unit 4: Cryopreservation and vitrification of gametes, embryos and ovarian cortex.

Unit 5: In vitro fertilization and early embryonic development.

Unit 6: Intrauterine artificial insemination and embryo transfer.

Unit 7: Sex selection before fertilization.

Unit 8: Cloning

Unit 9: Bioethical and legal aspects of reproductive biotechnologies.

Unit 10: PRACTICES

Unit 10.1 Germ cells quality assesment

Unit 10.2 Germ cells, embryo and ovarian and testicular tissues cryopreservation

Unit 10.3 In vitro fertilization

Unit 10.4 Evaluation of gene expression in oocytes/embryos

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	CB01 CB02 CB03 CB04 CB05 CE21 CG01 CG02 CG03 CG04 CG05 CT01 CT02 CT03 CT04	1	25	Y	N	Theoretical classes will be taught using an expository method. Technologies such as clickers will be used to assess the development of the classes.
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CG02 CG03 CG04 CG05 CT01 CT02 CT03	0.8	20	Y	Y	Practical work in the laboratory or with simulators. The evaluation of the practicals is compulsory, averaging with the rest of the assessable items with a minimum mark of 4.
Workshops or seminars [ON-SITE]	Combination of methods	CG01 CG02 CG03 CT01 CT02 CT03	0.2	5	Y	N	Teaching a seminar by an expert in reproductive biotechnologies.
Group tutoring sessions [ON-SITE]	Group tutoring sessions	CG02	0.2	5	Y	N	Group tutorials will be held in the activity classes. Games will be used to reinforce and resolve doubts about the theoretical contents.
Formative Assessment [ON-SITE]	Assessment tests	CB01 CB02 CB03 CB04 CB05 CE21 CG02 CT01 CT02 CT03	0.2	5	Y	Y	There will be 2 evaluation tests (partial). The second test will take place on the day of the ordinary exam. The percentage of each test is proportional to the number of subjects to be assessed. If the subject is not passed by partial tests, you can choose to take a final exam in the extraordinary call. A minimum of 4 is required in the theory item to make average with other evaluable items.
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	CE21 CG02 CG03 CG04 CT01 CT02 CT03	1	25	Y	N	Time dedicated by the students for the completion of the practical work
Study and Exam Preparation [OFF-SITE]	Self-study	CB01 CB02 CB03 CB04 CB05 CE21 CT01 CT02 CT04	2.6	65	Y	N	Time spent by students for study and test preparation
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

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
Practical exam	20.00%	20.00%	Several tests will be carried out on the virtual campus in which the contents derived from the practicals will be evaluated. In addition, students will have the opportunity to explain the scripts of the scripts before the beginning of the practicals. This will be added to the rest of the evaluable activities as long as the average of all the work derived from the practicals reaches at least a score of 4. Those students who do not attend any of the practicals without a justified reason or who do not attend them continuously, will be examined by means of an oral exam and in the laboratory. For repeating students, it will not be necessary to do the

			practicals for 2 consecutive years as long as they have been done previously. However, it will be necessary to be evaluated in the same way as for the continuous evaluation in order to pass the course.
Test	70.00%	70.00%	Continuous assessment: there will be 2 tests. The first test will be eliminatory with a value of 4. The second test will be carried out on the day of the ordinary. It will be added to the rest of the The second test will be taken on the day of the ordinary one. It will be added to the rest of the evaluable activities as long as the average of the 2 tests reaches at least a score of 4. Non-continuous assessment: the student in non-continuous assessment will take a single test of all the theory in the regular the ordinary exam session. It will be added to the rest of the evaluable activities as long as it reaches a minimum score of 4.
Assessment of problem solving and/or case studies	10.00%	10.00%	A problem or case will be proposed and solved by means of a debate league. Review activities will also be carried out through the creation of audiovisuals.
Total:		100.00%	100.00%

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).

Evaluation criteria for the final exam:

Continuous assessment:

All students are considered to be in continuous mode unless they are informed otherwise (non-continuous mode) by means of the procedure established by the centre. The change of modality (from continuous to non-continuous) can be made as long as the student has not reached more than 50% of the evaluable activities and that will correspond to the evaluation of the first test and the first 2 practicals.

There will be 2 tests. The first test will be eliminatory with a value of 4. The second test will be carried out on the day of the ordinary one. It will be added to the rest of the evaluable activities as long as the average of the 2 tests and the average of all the works derived from the practicals reach at least a score of 4 in each evaluable item (theory and practice). For those students who, even though they have taken the first test, would like to take the whole theory subject in the ordinary one, they may do so by waiving the grade of the first test and must inform the teaching staff at least one week before the ordinary one.

In order to pass the course it will be necessary to obtain 5 points through the sum of all the evaluation systems (theoretical and practical evaluation tests and problem solving or case studies).

Non-continuous evaluation:

A student will be considered to be following non-continuous assessment when he/she has expressed interest in changing from continuous to non-continuous or has not followed continuous assessment since the beginning of the subject. In this case, in order to pass the subject, it will be necessary to take a single theoretical and practical (oral) test in the ordinary exam session. Obtaining at least a 4 in each part (theory and practice) will allow the sum of both parts to be added together.

To pass the course it will be necessary to obtain 5 points through the sum of all the evaluation systems (theoretical and practical evaluation tests and problem solving or case studies).

Specifications for the resit/retake exam:

Students who do not pass the course in the ordinary exam will be able to take the exam of all the theoretical and practical contents of the course in the extraordinary exam. If in the ordinary exam the practical part has been graded with more than 4, this mark can be taken into account for the extraordinary exam. With a mark lower than 4, the student will have to evaluate the practical part in the extraordinary exam (orally in the case of students in non-continuous assessment). Obtaining at least a 4 in each part (theory and practical) will allow both parts to be added together. To pass the course it will be necessary to obtain 5 points through the sum of all the evaluation systems (theoretical and practical evaluation tests and problem solving or case studies).

Specifications for the second resit / retake exam:

Only students who meet the requirements set out in the current Student Assessment Regulations of the University of Castilla-La Mancha will be eligible for this call, and they will be assessed in accordance with the criteria applied in the extraordinary call.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Unit 1 (de 10): Introduction to animal biotechnology.	
Comment: The detailed planning of the activities will be available on the virtual campus at the beginning of the course.beginning of the semester (within the first three weeks of the same).	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Lomgobardi-Givan A.	Flow cytometry. First principles.	Wiley Liss.			2001	
Schatten H, Constantinescu G.	Comparative Reproductive Biology.	Blackwell Publishing.			2007	
Mutto A, Mucci N, Kaiser G.	Bioteconología aplicada a la Reproducción y Mejoramiento Animal	EAE Editorial Academia Española.			2011	
Gustavo A. Palma	Bioteconología de la reproducción	Primera Edición 2001			2001	
Arias-Álvarez M, García-García RM, Lorenzo-González PL, García-Rebollar P.	Bioteconología de la Reproducción aplicada a especies de interés veterinario.	Monografías INIA. Serie Ganadera.			2017	