

**1. General information****Course:** ANIMAL REPRODUCTION BIOTECHNOLOGY**Code:** 60633**Type:** CORE COURSE**ECTS credits:** 6**Degree:** 402 - UNDERGRADUATE DEGREE PROGRAMME IN BIOTECHNOLOGY**Academic year:** 2022-23**Center:** 601 - E.T.S. AGRICULTURAL ENGINEERS AND MOUNTS AB**Group(s):** 10**Year:** 4**Duration:** C2**Main language:** Spanish**Second language:** English**Use of additional languages:****English Friendly:** Y**Web site:****Bilingual:** N

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**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

**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.

| 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 through a master lesson. At the end of each class, some questions with clicker technologies will be carried out and the most important points of the class will be highlighted. |
| Laboratory practice or sessions [ON-SITE]                                   | Practical or hands-on activities | CG02 CG03 CG04 CG05 CT01 CT02 CT03                                         | 0.8                                         | 20         | Y  | N   | Practical activities in the reproduction laboratory.                                                                                                                                                               |
| 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   | In group tutoring sessions, a review of the most important content will be carried out using group activities.                                                                                                     |
| Mid-term test [ON-SITE]                                                     | Assessment tests                 | CB01 CB02 CB03 CB04 CB05 CE21 CG02 CT01 CT02 CT03                          | 0.2                                         | 5          | Y  | Y   | There will be a test in the middle of the semester that may release material for the ordinary. The second test will be held on the ordinary day.                                                                   |
| Practicum and practical activities report writing or preparation [OFF-SITE] | Self-study                       | CE21 CG02 CG03 CG04 CT01 CT02 CT03                                         | 1                                           | 25         | Y  | N   | A report of the laboratory practices carried out will be prepared.                                                                                                                                                 |
| Study and Exam Preparation [OFF-SITE]                                       | Self-study                       | CB01 CB02 CB03 CB04 CB05 CE21 CT01 CT02 CT04                               | 2.6                                         | 65         | N  | -   |                                                                                                                                                                                                                    |
| <b>Total:</b>                                                               |                                  |                                                                            | <b>6</b>                                    | <b>150</b> |    |     |                                                                                                                                                                                                                    |
| <b>Total credits of in-class work: 2.4</b>                                  |                                  |                                                                            | <b>Total class time hours: 60</b>           |            |    |     |                                                                                                                                                                                                                    |
| <b>Total credits of out of class work: 3.6</b>                              |                                  |                                                                            | <b>Total hours of out of class work: 90</b> |            |    |     |                                                                                                                                                                                                                    |

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 |
| Practicum and practical activities reports assessment | 30.00%                | 30.00%                     |             |
| Mid-term tests                                        | 70.00%                | 70.00%                     |             |
| <b>Total:</b>                                         | <b>100.00%</b>        | <b>100.00%</b>             |             |

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:

Students who have released part of the subject by obtaining a 4 in the first test of topics 1 to 5 will only have to examine topics 6 to 10 in the test that will be held in the ordinary call. If the average is at least 4 between both tests, they will be given an average with the rest of the assessable activities (practical evaluation and evaluation tests).

Students who have not released part of the subject in the first test will have to examine all the theoretical contents in the ordinary call, making an average with the rest of the activities from obtaining a 4.

To pass the course it will be necessary to obtain 5 points through the summation of all the evaluation systems (preparation of practical reports and evaluation tests).

##### Non-continuous evaluation:

It will be considered that a student follows the non-continuous evaluation when he has presented less than 50% of the evaluable activities. In this case, to pass the course it will be necessary to take a single theoretical and practical test in the ordinary call. Obtaining a minimum of 4 in each part (theory and practice) will allow to average both parts. To pass the course it will be necessary to obtain 5 points through the summation of all the evaluation systems (preparation of practical reports and evaluation tests).

#### Specifications for the resit/retake exam:

Students who do not pass the subject in the ordinary call, may take all the theoretical contents of the subject in the extraordinary call. The assessment obtained in the practical activity items will be saved for this call and during the following 2 academic years.

To pass the course it will be necessary to obtain 5 points through the sum of all the evaluation systems (evaluation of practices and evaluation test) in continuous evaluation and for non-continuous evaluation (preparation of reports of practices and evaluation tests).

#### Specifications for the second resit / retake exam:

Only students who meet the requirements set out in the Student Assessment Regulations of the University of Castilla-La Mancha will be able to access this call, which will be evaluated 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 9): Introduction to animal biotechnology.                                                                                                                                                           |       |
| <b>Comment:</b> The detailed planning of the activities will be available on the ETSIAM website and Virtual Campus of the subject at the 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.                                                | Biotechnología aplicada a la Reproducción y Mejoramiento Animal               | EAE Editorial Academia Española.  |      |      | 2011 |             |
| Gustavo A. Palma                                                           | Biotechnología de la reproducción                                             | Primera Edición 2001              |      |      | 2001 |             |
| Arias-Álvarez M, García-García RM, Lorenzo-González PL, García-Rebollar P. | Biotechnología de la Reproducción aplicada a especies de interés veterinario. | Monografías INIA. Serie Ganadera. |      |      | 2017 |             |