

Academic Year/course: 2021/22

66863 - Laboratory Animal Science

Syllabus Information

Academic Year: 2021/22

Subject: 66863 - Laboratory Animal Science

Faculty / School: 105 - Facultad de Veterinaria

Degree: 617 - Master's in Global Health: Integration of Environmental, Human and Animal Health

ECTS: 6.0

Year: 1

Semester: Annual

Subject Type: Optional

Module:

1. General information

1.1. Aims of the course

By taking this course, the student will acquire the adequate preparation and training in theoretical aspects to carry out and design animal experimentation procedures, reaching a training level equivalent to the functions a, b, c and d, included in the Directive 2010/63/EU and developed at state level by the Order ECC/566/2015, of 20/03/2015, which lays down the training requirements that must be fulfilled by personnel handling animals for experimentation purposes.

After acquiring this theoretical knowledge, students will have the opportunity in the future to complete their training with animal handling practices by carrying out the Work Under Supervision, necessary to obtain official training for the different functions.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the results course provides training and competence to contribute to some extent to your achievement:

Goal 3: Health and Well-being

Goal 4: Quality education

Goal 8: Decent work and economic growth

1.2. Context and importance of this course in the degree

Due to it is an elective subject, the learning results achieved in this subject are intended to contribute, together with the other subjects of the Translational Research specialization module, to a better training of the students to carry out a research activity that involves the use of animals as experimental models.

1.3. Recommendations to take this course

This course is recommended exclusively for students who have completed a Degree in (animal) biology, medicine, veterinary medicine or any other discipline that add studies in animal biology and physiology into its training programme. For students coming from other Degrees who wish to take this subject and get the training it will be necessary to demonstrate a training of at least 20 h in Animal Biology and Physiology.

Furthermore, it is recommended that students have studied and passed the subject "Quantitative Epidemiology and Advanced Statistics" in the master's degree. In this subject, 10 hours are given for "Topic 2: Design and analysis of working protocols in animal experimentation: field and clinical trials", which facilitates the acquisition of the necessary tools to be able to design an experimental procedure, which is one of the skills that this course aims to achieve.

2. Learning goals

2.1. Competences

All competencies and learning outcomes for this subject are listed in Annex I of the Order ECC/566/2015, dated 20/03/2015, establishing the training requirements for personnel handling animals for experimental purposes, and describing in detail the learning outcomes for each of the core and function-specific modules (a, b, c and d) (https://www.boe.es/diario_boe/txt.php?id=BOE-A-2015-3564).

Student's competencies after completing the course

- Understand the national and international regulations governing projects involving experimental animals.
- Identify, understand and apply animal welfare and ethical issues, as well as the principle of the three Rs, related to the use of animals in scientific procedures.
- Know the main anatomical, physiological, reproductive, genetic and behavioural characteristics of rodents, lagomorphs, equids, ruminants, pigs and carnivores.
- Describe the general characteristics of stabling, feeding, care and handling of the above animal species, including husbandry practices and health and environmental controls.
- Identify manipulations that can cause pain, suffering or distress to the animal throughout a procedure and know the corrective measures that can be applied to minimize it.
- Know the existing euthanasia methods best suited to minimise the suffering of each animal species.
- Know the procedures for handling, restraining, administering substances and obtaining samples in the above animal species.
- Ability to apply the basic methods of anaesthesia for each experimental procedure and animal species.
- Know and be able to apply the basic principles of surgery, including preoperative evaluation, preparation for surgery (equipment preparation and aseptic technique), postoperative care and monitoring.
- Explain and develop all the necessary stages for the design of projects and experiments in which the use of animals is required.

2.2. Learning goals

If students complete the course successfully, they should be able to?

By completing this subject, the student will acquire the appropriate preparation and training to carry out and design animal experimentation procedures, reaching a training level equivalent to the functions a, b, c and d, set out in directive 2010/63 / EU and developed at the state level by Order ECC / 566/2015, of 03/20/2015, which establishes the training requirements to be met by personnel who handle animals for experimental purposes. Annex I of this order describes in detail the learning results of each of the core and specific modules to each function

(https://www.boe.es/diario_boe/txt.php?id=BOE-A-2015-3564).

2.3. Importance of learning goals

It makes possible to contribute to the training of professionals in the translational research field, capable of developing procedures that require the use of experimental animals, both in the academic field and in private enterprise.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he or she has achieved the intended learning outcomes through the following assessment tests:

In order to pass the course it will be necessary to pass, separately, the 3 evaluation tests.

Midterm exam 1. Evaluation of the theoretical and practical contents. This exam will consist of 25 multiple choice questions, corresponding to the theoretical topics, the practice sessions, as well as the tutored works of the modules I-VI. This test will represent the 35% of the final qualification.

Midterm exam 2. Evaluation of the theoretical and practical contents. This exam will consist of 35 multiple choice questions, corresponding to the theoretical topics, the practice sessions, as well as the tutored works of the modules VII-XI. This test will represent the 45% of the final qualification.

This test will consist of multiple choice questions with just one correct answer. Incorrect answers will not be penalized with negative points. It will be assessed on 10 final points and to obtain the score equivalent to 5, it will be necessary to reach 60% of the maximum score.

In each of the official calls (June and September) the student may attend one or both of the partial sessions, depending on his/her own criteria. Additionally, students may take the first partial exam during the school year after completing Module VI. Passing this exam will result in the elimination of this part of the course. Passed partial exams will be saved and counted only during the academic year in progress.

Midterm exam 3. Supervised work and class participation. The presentation, oral presentation and defense of the work carried out will be evaluated with a maximum of 10 points and a minimum score of 5 points will be necessary to be able to weigh this section with the rest. This test will represent 20% of the final qualification. In addition to the presentation, the student must actively participate in asking questions to their classmates.

In the evaluation of supervised work, the following will be valued:

- The ability to obtain, order and synthesize the necessary information for the elaboration of an experimental procedure.
- The ability to express with adequate terminology all the sections that comprise an experimental procedure.
- The ability to reason and argue the methodologies used in the elaboration of the experimental procedure.

- The ability to generate audiovisual support material for the oral presentation of your design.
- The critical evaluation of works in animal experimentation.

Initially, the work will be distributed on the first day of class in April and will be presented on the last day of class in April, during the scheduled session dedicated to the seminars. The student may also decide to pass this test on the day of the global test called by the center.

The sum of the grades of these three midterms exams will determine the final grade of the course.:

Final grade = 35% Midterm exam 1 + 45% Midterm exam 2 + 20% Midterm exam 3

Global assessment: Students who have not chosen the continuous assessment or who have not passed the subject by this procedure will have the right to sit for a global assessment that will consist of a written test that assesses the theoretical and practical contents of the subject and the ability to develop an experimental procedure. This test will have a score between 0 and 10 points. Assessment criteria: the evaluation of theoretical and practical contents will suppose 80% of the final grade and the experimental procedure will suppose the 20%.

According with the Regulation of Learning Assessment Standards of the University of Zaragoza (Agreement of the Governing Council of 22 December 2010), the results obtained by the student will be graded according to the following numerical scale from 0 to 10, with the expression of one decimal place, to which the corresponding qualitative grade may be added:

- 0-4.9: FAIL.
- 5.0-6.9: PASS
- 7.0-8.9: GOOD (NT).
- 9.0-10: EXCELLENT (SB).

Students with a grade over 9.0 might be awarded with honours and it could be given to more than the 5% of the enrolled students during the academic year

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives:

Theory sessions: Lectures (35 hours), with the theoretical contents listed below, will be given in the classroom during 35 sessions of 50 minutes.

Practice sessions: They will be given in the different facilities of the Veterinary Faculty and the Biomedical Research Centre of Aragón (CIBA) in sessions of variable duration, as detailed in the programme, up to a total of 24 hours. Initially, a brief explanation will be given to the students, and later the students will do the practice.

Supervised works: Each student will prepare and present a tutored work on an experimental procedure, which will be exposed in the classroom (it will take 13 hours for the student). First, an explanation will be given on how to carry out an experimental procedure (1 h of theory) by the teacher. Students will have to collect the information, select it, order it and elaborate a presentation with it. Finally, students will attend a seminar, where they will perform the presentation of their work and attend the presentation of the rest of the students of the subject (1 h).

In addition, students will carry out 3 other tutored works that will mean a total of 7 hours of autonomous work for the students, which will be discussed and shared during the corresponding practice sessions.

Didactic materials of the subject (class presentations, practice protocols, recommended bibliography, web addresses) will be available in advance in the Anillo Digital Docente (ADD) of the University of Zaragoza. This will allow students to review in advance the documentation corresponding to a specific lecture or practice session, thus favouring their participation in the development of a real class or participatory practice.

4.2. Learning tasks

The course is structured in 35 hours of participatory lectures and 24 hours of laboratory or computer classroom practice sessions and visits to a research centre. In addition, the students must carry out and present orally during 1 hour of the seminar a work on an experimental procedure design.

The 35 hours of lectures are distributed in 12 thematic modules. The 17 practice sessions will be developed temporarily adjusting as much as possible to the concepts developed in the lectures. The tutored work will serve to integrate the knowledge acquired by the students in this and other subjects of the master, so that they are able to design an experimental procedure.

4.3. Syllabus

The contents of the course programme will be adapted to the requirements of Order ECC/566/2015 of 20/03/2015 for training in functions a, b, c and d.

A) Lectures

Lectures are organised on the basis of the 12 modules set out in Order ECC/566/2015 of 20/03/2015:

I. National legislation (1 h)

Topic 1. Legislation on animal experimentation. European, national and regional legislation.

II. Ethics, animal welfare and the 3Rs (level 1 and 2) (4 h)

Topic 2. Ethical principles of animal testing.

Topic 3. Animal Welfare: The Basics.

Topic 4. The principle of the 3 Rs.

Topic 5. Ethics Committees in animal experimentation and authorized bodies: Objectives and functions. Application for authorization of projects.

Topic 6. Alternative methods to animal testing.

III. Basic and adequate biology (levels 1 and 2) (3 h)

Topic 7: Anatomy, physiology, reproduction and behaviour of rodents and lagomorphs.

Topic 8: Anatomy, physiology, reproduction and behaviour of carnivores.

Topic 9: Anatomy, Physiology, Reproduction and behaviour of ruminants/equids/pigs.

Topic 10. Anatomy, Physiology, Reproduction and behaviour of ruminants/equids/pigs.

IV. Fundamentals of Animal Biology and Physiology *

V. Care, health and handling of animals (level 1) (5 h)

Topic 11. Care and accommodation: types of facilities.

Topic 12. Cleaning and disinfection of facilities. Safety and hygiene of personnel. Disposal of waste and cadavers.

Topic 13. Safety and hygiene of personnel working in facilities with experimental animals.

Topic 14. Transport of animals.

Topic 15. Recognition of the sick animal: health status and prevention of pathologies.

Topic 16. Breeding programs. Colony management. Genetically modified animals.

VI. Recognition of pain, suffering and distress (3 h)

Topic 17. Stress and identifying of the suffering and stress signs. Environmental enrichment to ensure animal welfare.

Topic 18. Recognition of Pain, Suffering and Distress. Severity and Endpoint.

VII. Métodos incruentos de sacrificio (niveles 1 y 2) (2 h)

Topic 19. Euthanasia: Chemical and physical methods.

VIII. Procedimientos mínimamente invasivos sin anestesia (niveles 1 y 2) (5 h)

Topic 20. Administering substances and obtaining samples.

Topic 21. Diet modification, force feeding and use of metabolic cages.

Topic 22. Tissue biopsy.

Topic 23. Behavioural tests.

IX. Anaesthesia for minor procedures (3 h)

Topic 24. Basic Principles of Anaesthesia.

Topic 25. Anaesthesia y sedation for minor procedures in rodents and lagomorphs.

Topic 26. Anaesthesia y sedation for minor procedures in ruminants, equids, pigs and carnivorous.

X. Advanced anaesthesia for surgery or prolonged procedures (6 h)

Topic 27. General information about advanced anaesthesia for prolonged procedures: induction, maintenance, monitoring, recovery and perioperative analgesia.

Topic 28. Advance anaesthesia in rodents and lagophorms.

Topic 29. Advance anaesthesia in ruminants, equids and pigs.

Topic 30. Advance anaesthesia in carnivorous.

XI. Principles of surgery (2 h)

Topic 31. Principles of surgery.

XII. Design of projects and procedures (levels 1 and 2) (1 h)

Topic 32. Design of an experimental procedure. Analysis of experimental procedures in the scientific literature.

*This subject is exclusively recommended for students with a degree in (animal) Biology, Medicine, Veterinary Medicine or any other degree that includes on its syllabus animal Biology and Physiology studies. For students from other degrees not mentioned before, they will have to demonstrate an animal Biology and Physiology training of 20 hours at least.

B) Practical programme

There will be 17 practical sessions of variable duration, as detailed below:

II. Ethics, animal welfare and the 3Rs (level 1 and 2) (4 h)

Practice session 1. Sources of information related to ethics, animal welfare and the 3Rs Search tools. (1 h)

Practice session 2. Discussion on animal experimentation in society. (2 h)

Practice session 3. Non-technical summary of a project (1 h)

III. Basic and adequate biology (levels 1 and 2) (3 h)

Practice session 4. Basic techniques for handling and holding rodents and lagomorphs (3 h)

VII. Bloodless methods of slaughter (level 1 and 2) (1 h)

Practice session 5. Bloodless methods of sacrifice. Practical demonstration. Slaughter methods used in scientific literature. (1 h)

VIII. Minimally invasive procedures without anaesthesia (levels 1 and 2) (9 h)

Practice session 6. Identification and sexing of rodents and lagomorphs (1 h)

Practice session 7. Drug preparation (1h)

Practice session 8. Administration of substances and obtaining samples in lagomorphs (1 h)

Practice session 9. Administration of substances and obtaining samples in rodents (1 h)

Practice session 10. Basic techniques for handling and restraining horses, ruminants and pigs. (3 h)

Practice session 11. Basic techniques for handling and restraining carnivorous. Electrocardiogram and blood pressure measure. (2 h)

IX. Anaesthesia for minor procedures (2h)

Practice session 12. Understanding and handling of the anaesthesia equipments (2 h).

X. Advanced anaesthesia for surgery or prolonged procedures (2h)

Practice session 13. Recognition of postoperative pain (1 h).

Practice session 14. Anaesthesia and analgesia workshop (1 h)

XI. Surgery principles (3 h)

Practice session 15. Surgeon's aseptic preparation (1 h).

Practice session 16. Preparation of the surgical field under aseptic conditions (1 h).

Practice session 17. Sutures: patterns and types (1 h).

C) Supervised works

Students will have to carry out 4 supervised works related to the practice sessions or any other topic of the syllabus and they will spend a total of 20 hours of autonomous work. These works correspond to the following modules:

II. Ethics, animal welfare and the 3Rs (level 1 and 2) (4 h off-site)

Work 1. Non-technical summary of a project (related to practice 3)

VII. Bloodless methods of slaughter (level 1 and 2) (2 h off-site)

Work 2. Slaughter methods used in the scientific literature (related to practice 5)

VIII. Minimally invasive procedures without anaesthesia (levels 1 and 2) (1 h offsite)

Work 3. Drug preparation (related to practice 7).

XII. Design of projects and procedures (levels 1 and 2) (13 h offsite)

Work 4. Design of an experimental procedure.

D) Seminars

XII. Design of projects and procedures (levels 1 and 2) (1 h)

Presentation of the experimental design made by students in their supervised work and discussion with the teacher.

4.4. Course planning and calendar

The planning of this course and the calendar corresponding to the face to face theory sessions and practice sessions and the presentation of supervised works, as well as the corresponding evaluation tests are organized from the Dean's Office of the Faculty of Veterinary and informed through the website of the Faculty (<https://veterinaria.unizar.es/>)

The dates and key milestones of the course have been described in detail, along with those of the other courses of the University Master in OneHealth: Integration of environmental, human and animal health, in the document "Programming of activities" located on the website of the Faculty of Veterinary.

Coordinator:

Laura Grasa López email: lgralo@unizar.es

Tutorials:

Office hours will be set on the start day of the course in each academic year.

4.5. Bibliography and recommended resources

Normally, the bibliography for the current academic year is kept up to date and is consulted on the Library's website (search for recommended bibliography at biblioteca.unizar.es).