**Module:**

**Reduction and Refinement in Experimental Design and Methodology. Research and Development of Drugs**

This module provides the practical and theoretical knowledge and skills regarding experimental design and methodology required by designated veterinarians and other onsite personnel responsible for the welfare and care of laboratory animals in the conduct of experimental procedures.

This course covers the most important aspects in relation to the reduction in the number of animals used in research, experimental design, literature searches and presentation of results. It also deals with refinement through the study of the main non-invasive and minimally invasive techniques and refinement in surgical techniques. The module also provides an overview of the strategy and processes required in research and drug development.

The content of this course also complies with the training requirements set out in European Directive EU63/2010 developed by the European Commission in respect of the following modules: 10. Design of procedures and projects (level 1), 11. Design of procedures and projects (level 2), 22. Principles of surgery and 51. Information provision and retrieval.

Block I: Reduction

Topic 1. Experimental design

Topic 2. Systematic Reviews

Topic 3. Internal validity and bias analysis

Block II: Refinement

Topic 4. Asepsis and preparation for surgery. Aseptic surgery in rodents

Topic 5. Pre-operative assessment, perioperatory and postoperatory care.

Fluidotherapy and antibiotherapy

Topic 6. Microsurgery techniques: vascular surgery

Topic 7. Blood sampling techniques

Topic 8. Recording of physiological parameters by non-invasive and minimally invasive techniques

Topic 9. Imaging techniques

9.1. Bioluminiscence and fluorescence

9.2. Magnetic Resonance Imagining (MRI)

9.3. Positron Emission Tomography (PET)

9.4 Echography

9.5 Micro Computed Tomography

Block III: Experiments under legal requirements

Topic 10. Drug development and Drug Efficacy

Topic 11.Development of veterinary drugs

Topic 12. Drug development: Safety and toxicology

Topic 13. Biologicals: immunogenicity and immunotoxicity

Topic 14: Translational research

Topic 15: Quality standards: Good Laboratory Practice and consistency in conducting scientific procedures and correct handling, storing, recording, and ensuring traceability of samples

P R A C T I C A L S E S S I O N S

Practical session 1.1: Imaging techniques in rodents: Positron Emission Tomography,

Ecography. MicroCT, Bioluminiscence and Biofluorescence (IVIS).

Practical session 1.2: Imaging techniques: Magnetic Resonance Imaging (MRI).

Practical session 2.1: Principles of surgery in refinement. Asepsis. Sutures and knots. Aseptic surgery in rats. Minimally invasive devices

Practical session 2.2: Introduction to microsurgery.

Practical session 2.3: Cannulation, catheters.

Practical session 2.4: Laparoscopy and Ultrasound guided vascular cannulation

Practical session 2.5: Blood sampling techniques in rodents

Practical session 3.1: Telemetry

Practical session 3.2: Plethysmography.

**Duration of course**: 12 ECTS (80 attendance hours)

**Course dates**: 1 October -15 December, 2024.

**Attendance dates at UAB**: 10 days to be determined