INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Reproductive Technologies			Field of study	Animal Science		
Master in	Technology and Animal Science			School	School of Agriculture		
Academic Year	2023/2024	Year of study	1	Level	2-1	ECTS credits	6.0
Type	Semestral	Semester	1	Code	5026-810-1105-00-23		

Workload (hours)	162	Contact hours	T -	TP -	PL -	TC -	S -	E -	OT -	O -

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s): Ramiro Corujeira Valentim, Ariane Flávia do Nascimento

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
Know the main reproductive technologies used in Animal Production, their potentials and limitations. Introduction to Animal Reproduction experimentation.

Prerequisites

Before the course unit the learner is expected to be able to:
Fundamental knowledges of animal reproduction.

Course contents

Sexual differentiation in mammals. Male genital tract (review). Spermatogenesis in mammals. Female genital Tract (review). Oogenesis and foliculogenesis. Sperm-oocyte interaction. Early embryogenesis. Ovarian dynamic. Control of ovarian activity. Oocyte retrieval. Sperm technology. Sperm sexing. Artificial insemination. In vitro fertilization techniques. Nuclear transfer. Lab embryo culture. Embryo sexing. Embryo preservation. Embryo transfer. Xenotransplantation.

Course contents (extended version)

1. 1. Sexual Determinism in Mammals
   - Differentiation of Primordial Germ Cell
   - Differentiation of Gonad
   - Differentiation of Genital Tract
   - Intersexuality
2. Male Genital Tract
   - Spermatogenesis
   - Maturation of Sperm
3. Semen Technology
   - Semen Collection
   - Semen Evaluation
   - Fresh Semen
   - Chilled Semen
   - Frozen Semen
   - Sperm Sexing
4. Female Genital Tract
   - Oogenesis
   - Foliculogenesis
   - Oocyt Maturation
   - Sperm in the Female Genital Tract
   - Sperm-Oocyte Interaction
5. Control of Ovarian Activity
   - Follicular Dynamic
   - Induction of Ovulation (New Procedures)
   - Ovum Pick-Up
6. Fertility
   - Natural Fertility
   - In Vitro Fertility (IVF)
   - Other Alternatives to IVF
7. Embryogenesis
   - Vertebrate Embryo Organization
   - Vertebrate Early Embryogenesis
   - Congenital Disorder
   - Lab Embryo Culture
   - Embryo Retrieval
   - Embryo Sexing
8. Cloning
   - Nuclear Transfer
   - Oocyte Activation
   - Nuclear Modification
   - Transgenesis
9. Embryo Preservation
   - Embryo Criopreservation
   - Frozen Embryo Survival
   - Vitrification
   - Ultra-Rapid Freezing
10. Embryo Transfer
    - Donor-Receptor Syncronization
    - Tubal or Uterine Embryo Transfer
    - Fresh or Freezed Embryo Transfer
    - Embryo Transfer Techniques
11. Xenotransplantation in Animal Reproduction
    - Autotransplantation
    - Allotransplantation

Recommended reading

1. PINKERT, C. A., 2014. Transgenic Animal Technology – A laboratory handbook. 3ª Edição, Elsevier, Londres, Reino Unido, 714 pp.
2. GORDON, I., 2004. Reproductive technologies in farm animals. CABI International, Wallingford, Reino Unido, 332 pp.

Recommended reading

3. PALMA, G. A., 2001. Biotecnologia de la reproducción. Instituto Nacional de Tecnologias Agropecuarias, Buenos AIres, Argentina, 708 pp.
4. BANSAL, K., 2011. Manual of intrauterine insemination (IUI), in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI). 2ª Edição, J. B. M. P. , Nova Deli, Índia, 121 pp.
5. COHEN et al., 2008. Textbook of assisted reproductive technologies: laboratory and clinical perspectives. D. K. GARDNER, A. WEISSMAN, C. M. HOWLES, Z. SHOHAM (Eds), Informa HealthCare, EUA, 912 pp.

Teaching and learning methods

Lectures will be support by media and multimedia resources. Practical classes will engage direct working in lab and with animals. Seminars will allow teacher and students to explore a particular topic related to ART. Non present hours will involve training in a working environment. Students are expected to work largely on their own initiative although with the close support of a tutor.

Assessment methods

1. 1 Test (50%) and 1 Restrict Examination (50%) - (Regular, Student Worker) (Final)
2. General Examination (100%) - (Student Worker) (Final)
3. General Examination (100%) - (Regular, Student Worker) (Supplementary, Special)

Language of instruction

Portuguese

Electronic validation

Ramiro Corujeira Valentim	Teresa Maria Montenegro Araújo A. Correia	Alfredo Jorge Costa Teixeira	Ramiro Corujeira Valentim
17-01-2024	19-01-2024	19-01-2024	21-01-2024