DIPARTIMENTO DI SCIENZE

COURSE: **Reproductive Biology and Technology in mammals**			
ACADEMIC YEAR: **2018-2019**			
TYPE OF EDUCATIONAL ACTIVITY: (Basic, Characterizing, Affine, Free choice, Other) **BASIC**			
TEACHER: **Prof. Raffaele BONI**			
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phone: **+39 0971 205017**	mobile (optional):		
Language: **Italian**			
ECTS: **6** (**5** lessons & tutorials/**1** practice)	n. of hours: **52** (**40h** lessons & tutorials/**12h** practice)	Campus: **Potenza** **Dept. Sciences:** **Master Degree in Biotechnology for the diagnostics in Medical, Pharmaceutical and Veterinary Sciences (LM-9)**	Semester: **I** **01/10/2018 – 20/12/2018-20/01/2019**

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

This course is aimed to provide the student with basic information on the morphological and functional characteristics of the male and female genital system. Describe the main mechanisms involved in the development and maturation processes of gametes, fertilization, embryonic and fetal growth, pregnancy and delivery. Characterize the sex cycle of the female, describe its dysfunctions and intervene on dynamics through estrus synchronization and induction techniques. Describe the application of assisted reproduction techniques (oocyte collection, in vitro fertilization, embryo culture) and advanced breeding techniques for cloning and production of transgenic animals. Proceed to the evaluation of male and female germplasm. Provide basic information on cryobiology and manipulation of stem cells. The course will enable you to acquire the basic knowledge of mammalian reproduction, to understand its functioning mechanisms, to learn technologies that can affect its efficiency and to identify physiological and pathological conditions that can negatively affect its development.

o Knowledge and understanding:
the student must demonstrate that he/she is able to frame problems related to reproductive activity and intervene by proposing appropriate strategies and technologies to solve any inefficiencies. The involvement of students during the theoretical lessons and exercises will have the purpose of keeping the focus high and highlighting and resolving any difficulties of comprehension.

o Ability to apply knowledge and understanding:
during the theoretical learning (frontal lessons) and exercises as well as during the final exam the student should demonstrate that he/she is able to analyze the effects of the various variables that can affect the animal reproductive efficiency by identifying the best strategies designed to solve any problems that have arisen. Achieving a diagnostic goal becomes the ultimate result of a discriminatory analysis that necessarily involves information gathered within the student's educational pathway, creating transverse links with courses previously performed. To support this logical path, the students should identify any analytical evidence that can confirm their hypotheses.

o Autonomy of judgment:
the student should be able to evaluate and choose the most suitable tools for setting up proper reproductive strategies that will meet the goals of optimizing reproductive efficiency. Such choices must be made in the respect of the well-being of the individuals considered, the laws in force, and the principles of bioethics.

o Communicative Skills:
the student should be able to explain in a simple way, even to non-sectoral people, the effects of proper animal breeding management, framing inefficiencies and proposing solutions. In the details of this narrative, biology and technology of animal and human reproduction technology will be dealt with using appropriate scientific language.

o Learning Skills:

At the end of the course, the student must be able to use bibliographic and computer tools to implement the acquired basic knowledge, and to update and enrich his/her knowledge through participation in specialized courses and seminars in the field.

PRE-REQUIREMENTS

None

SYLLABUS

Anatomy of the reproductive tract in human and domestic mammals
Elements of endocrinology in reproductive biology
Gametogenesis
Follicle growth and dynamics
Collection and evaluation of semen
Oocyte and follicle maturation
Mechanisms of fertilization
Embryo development
Sexual cycle: dynamics, dysfunction and manipulation (i.e., synchronization and induction)
Developmental biology and organogenesis
Pregnancy and childbirth
Assisted reproduction techniques
Superovulation and embryo transfer
In vitro embryo production - IVF
Ovum Pick-up
Micromanipulation, nuclear transfer, Transgenic animals
Stem Cells
Diagnostic techniques applied to the reproduction
Pregnancy diagnosis
Monitoring hormone dynamics

TEACHING METHODS

Theoretical lessons, Classroom and Laboratory tutorials.

EVALUATION METHODS

Oral examination

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- *Lenzi e Gandini "Biotecnologie della riproduzione umana", Carrocci Ed*
- *Czyba e Montella "Biologia della Riproduzione umana", Piccin ed*
- *Seren E. "Riproduzione negli animali d'allevamento" (di Hafez & Hafez). Libreria Universitaria (ed) Bologna*
- *Class material*
- *Tosti E. e Boni R. Oocyte maturation and fertilization. A long history for a short event. Bentham Ed. Open access at http://www.benthamscience.com/ebooks/9781608051823/index.htm*
- *Knobil and Neill "Physiology of Reproduction" Academic Press, Elsevier.*
- *Gordon I "Laboratory production of cattle embryos" CAB 2003*
- *WHO laboratory manual for the Examination and processing of human semen FIFTH EDITION Open access at http://apps.who.int/iris/bitstream/10665/44261/1/9789241547789_eng.pdf?ua=1*

INTERACTION WITH STUDENTS

At the beginning of the course, after describing the objectives, the program and the verification procedures, the teacher collects the names and the e-mail addresses of the students. It is a task of the teacher to build a mail-list with which invite students to log in to one of the educational material sharing site, which will be available from the end of the first lesson. Such material can be enriched with in-depth material on the basis of specific needs required by the course.

Weekly reception

day	***from***	***to***	***at***
Tuesday	*16:30*	*18:30*	*Teacher's room*
Wednesday	*16:30*	*18:30*	*Teacher's room*
Thursday	*9:30*	*11:30*	*Teacher's room*

This schedule may be changed due to teaching or academic duties. However, in addition to the scheduled weekly reception, the teacher is always available, when present in his room or lab, for personalized explanations with students, which may be done either by the students receiving as well as by email or phone service.

EXAMINATION SESSIONS (FORECAST)[1]

31/01/2019, 06/02/2019, 13/02/2019, 20/02/2019, 27/02/2019, 06/03/2019, 29/05/2019, 05/06/2019, 03/07/2019, 11/09/2019, 09/10/2019, 18/12/2019.

SEMINARS BY EXTERNAL EXPERTS YES NO X

FURTHER INFORMATION

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.