

Principles of Animal Embryology [268]

COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE		
LEVEL OF STUDIES	Undergraduate [Major Elective]		
COURSE CODE	268	SEMESTER	9 th
COURSE TITLE	PRINCIPLES OF ANIMAL EMBRYOLOGY		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Theory: Lectures		1	1
Laboratory practice		1	1
TOTAL		2	2
COURSE TYPE	Scientific area		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS:	No		
COURSE WEBSITE (URL):	https://oeclass.aua.gr/eclass/courses/765/		
TEACHING STAFF:	Theory: Balaskas C. Laboratory practice: Kalogiannis D.		

(2) LEARNING OUTCOMES

Learning outcomes
The course Principles of Animal Embryology describes the physiological mechanisms involved in fertilization and embryonic development, as well as the methods used to replicate these physiological procedures in laboratory conditions. It aims to present a review of the science of embryology and its terminology, using literature sources inclusive of acclaimed course books and original groundbreaking papers. It aims to present fertilization and embryonic development in vivo, and the basic methods used in gametes collection and preservation, embryo transfer, in vitro embryo production, sex determination and selection in embryos, embryo cloning and microsurgical division, production of transgenic animals and chimaeras. It aims to train students to identify microscopy embryo samples in various stages of development. Upon completion of the course the student should be able to: • Understand international and Greek terminology of embryology. • Comprehend animal embryonic development and the techniques available for the study of embryonic development stages in vitro, as well as their potential and limitations. • Comprehend all the modern techniques of assisted reproduction. • Identify embryo samples using microscopy. • Use safely and efficiently the necessary laboratory equipment and consumables (microscopes, image analysis), combining literature sources and World Wide Web. According to Bloom a student should be able to: 1. Describe gametes, fertilization, and embryonic development of animals. [KNOWLEDGE] 2. Describe the techniques used by modern embryology in animal production. [KNOWLEDGE] 3. Distinguish between the potential and the limitations of the techniques used in embryology. [UNDERSTANDING & EVALUATION] 4. Examine embryo samples and practice in vitro applications. [APPLICATION] 5. Combine microscopy observations, techniques and literature and thus comprehend embryonic development both in vivo and in vitro. [ANALYSIS & SYNTHESIS]
General Competences
• Search, analysis and synthesis of data, using the required technologies • Decision making • Autonomous work • Teamwork • Work in multidisciplinary environment • Production of new research ideas

- Respect of natural environment
- Promotion of free, constructive and inductive thinking

(3) SYLLABUS

- Epigenesis and embryonic development.
- Gametogenesis. Collection and preservation of genetic material.
- Fertilization.
- In vitro embryo production.
- Morula. Blastula. Embryo transfer techniques.
- Formation of embryonic body. Metaplasia of blastoderms.
- Embryonic appendages.
- Determination of embryo age and sex. Selection of sex in embryos.
- Embryo cloning and embryo microsurgical division.
- Transgenic animals and chimaeras. Production techniques.
- Principles of experimental and comparative embryology.
- Malformations.
- Latest developments in embryology.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face – Classroom discussion	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	PowerPoint presentations, multimedia and imaging systems, and the World Wide Web. Use of light and fluorescence microscopes and stereoscopes fitted with digital cameras and connected with computerised image analysis software. Use of inverted microscopes fitted with micromanipulation equipment. Embryo cultures. Student learning support by e-class. Communication with students via e-mail.	
TEACHING METHODS	Activity	Semester workload
	Lectures	13
	Laboratory practice	13
	Literature search and analysis	10
	Self study	14
	Course total (25 h of workload per ECTS)	50
STUDENT PERFORMANCE EVALUATION	Evaluation language: Greek Evaluation method: Written final examination. I. Theory (T): 60% of the final exam with short-answer questions. II. Laboratory (L): 40% of the final exam with multiple choice questions. Final score: (T)+(L) = 60+40=100% of the total final score.	

(5) ATTACHED BIBLIOGRAPHY

-Προτεινόμενη Βιβλιογραφία :

- Μάργας Ι.Ν. Εμβρυολογία των κατοικίδιων θηλαστικών. Εκδ. Οικ. Αφοι Κυριακίδη. Θεσσαλονίκη, 2004.
- Θεοδωρόπουλος Γ., Χαδιώ-Μάντζαρη Στ., Μπαλάσκας Χρ., Οικονομόπουλος Ι. Λειτουργική Ανατομική και Φυσιολογία των Ζώων. ISBN-13: 978-618-80647-8-2 Εκδόσεις Utopia. Αθήνα, 2014. Επιμέλεια- Μετάφραση του Functional Anatomy and Physiology of Domestic Animals, 4th edition, W.O. Reece, Wiley-Blackwell.
- Gordon I. Controlled Reproduction in Farm Animals. CABI, 1996.
- Field T.G. & Taylor R.E. Scientific Farm Animal Production. Pearson, 2016.

-Συναφή επιστημονικά περιοδικά:

Anatomy and Embryology
 Animal Biotechnology
 Animal Reproduction Science
 Cell
 Cell and Tissue Research
 Development
 Developmental Dynamics
 Journal of Anatomy
 Journal of Animal Science and Biotechnology
 Journal of Cytology and Histology

Journal of Histochemistry and Cytochemistry

Journal of Morphology

Nature

Nature Biotechnology

Nature Cell Biology

Nature Structural Biology