SYLLABUS

Name of the course (as specified in the approved curriculum) **Module 10 – Preventive Veterinary Medicine**	Number of ECTS credits **8**
Name of the course in Polish **Moduł 10 - Prewencja w Medycynie Weterynaryjnej**	

Unit providing the course
Department of Animal Genetics and Breeding, Department of Animal Breeding and Product Quality Assessment, Department of Animal Nutrition, Department of Animal Reproduction, Department of Internal Medicine and Diagnostics

Course co-ordinator
prof. dr hab. Dorota Cieślak

Field of study	Level	Profile	Semester
Animal Production Management	II – master studies	Academic-general	**4**

TYPE OF CLASSES AND COURSE LOAD
(Classes with teacher and student's own work)

Mode of studies: full-time		Mode of studies: part-time	-
- lectures	40	- lectures	-
- practical classes	40	- practical classes	-
- field classes	50	- field classes	-
- labs	0	- labs	-
- consultations	5	- consultations	-
- own student's work	50	- own student's work	-
- others	15	- others	-
Total number of hours	200	Total number of hours	-

OBJECTIVE OF THE COURSE

To acquaint students with current challenges in veterinary prevention, with a particular focus on genetic and laboratory diagnostics, the foundations of animal fertility, and reproductive biotechnology in farm animals. Upon completing the module, students should understand the principles of effective cooperation between veterinarians and animal production managers in solving major animal health problems and be able to apply the latest technologies implemented in animal health management.

TEACHING METHODS

Lectures: multimedia presentations
Classes: practical classes - computer lab, molecular lab, veterinary diagnostic lab; observation - dairy farm
Preparation of a phased project verified by the teacher.

	Course learning outcomes	The reference to the study field learning outcomes
Knowledge	O1 - the microbiological processes occurring in the gastrointestinal tract (GIT), as well as the animal-GIT microbiome interactions O2 - the advanced aspects of anatomy, embryology and physiology of selected livestock O3 - diagnostic methods (molecular genetics), techniques, systems, and technologies (ART assisted reproduction) used in livestock breeding and production, O4 - the impact of various management practices on animal health, productivity, and profitability of farming	AP2A_W07 AP2A_W10 AP2A_W12 AP2A_W13

Skills	O5 - search, critically analyze and interpret information from literature, databases and other sources related to animal science, present this knowledge and communicate with various stakeholders in oral, written, and graphical form O6 - use scientific literature in selected areas of animal science and discuss these topics with specialists from various fields using foreign congress language according to requirements set out for B2+ level of the Common European Framework of Reference for Languages, with particular reference to vocabulary in the field of animal science O7 - evaluate the possibilities to implement the diagnostic methods in animal rearing and use the specialized microbiological diagnostic techniques O8 - examine, using microscopy, and describe the histological gastrointestinal tract sections applying professional nomenclature from the field of anatomy, physiology, and histology	AP2A_U01 AP2A_U02 AP2A_U08 AP2A_U09
Social competences	O9 – lifelong learning and updating the cognitive skills, as well as to inspire and organize the learning process of other people; to demonstrate a creative attitude; to think and act in an entrepreneurial way O10 – take the ethical and social responsibility for the effects of the activities in the field of animal production with particular reference to domestic animals O11 – assess the risk of the business impact, personal threats and the safety of colleagues and the environment	AP2A_K01 AP2A_K03 AP2A_K04
Methods for verifying learning outcomes written tests - 3 courses (genetic diagnostics, embryology, reproductive biotechnology) oral presentations of phased project – 3 courses (USG, veterinary prevention, veterinary diagnostics)		Symbols of course learning outcomes 60% 40%

TEACHING CONTENTS

Lectures

1. Embryology

Early embryonic development in mammals and birds; cleavage and gastrulation; formation of extraembryonic membranes; implantation and placentation; development of the notochord, neural tube, somites, digestive and urogenital systems; principles of teratology and developmental anomalies.

2. Genetic Diagnostics in Animal Breeding

Cytogenetic techniques (chromosome preparation, banding, FISH); chromosomal abnormalities and disorders of sex development; molecular diagnostics (DNA isolation, PCR, sequencing, SNP arrays, GWAS); parentage testing; molecular detection of hereditary and production-related traits.

3. Reproductive Biotechnology in Farm Animals

Oocyte biology (COC evaluation, BCB test, in vitro maturation, OPU); sperm biology (quality assessment, CASA, flow cytometry); embryo development and evaluation (IETS standards), in vitro embryo production, IVF, ET, and ICSI.

4. Ultrasound Diagnostics (USG)

Basics of ultrasonography; analog–digital conversion; image formation and artifacts; applications of USG in animal production.

5. Veterinary Prevention and Emergency Assistance

Biosecurity principles; disease outbreak management; prevention of metabolic disorders; vaccination basics; mastitis and hoof disease prevention; calving assistance.

6. Basics of Veterinary Diagnostics with Parasitology Elements

Diagnostics and prevention of coccidiosis and necrotic enteritis; gastrointestinal health and microbiota of monogastric farm animals.

Classes

1. Embryology

Microscopy techniques; identification of embryonic and fetal developmental stages; development of endodermal and mesodermal organs in mammals and birds.

2. Genetic Diagnostics

Chromosome slide preparation; sex chromosome identification; detection of chimerism; DNA isolation and analysis; PCR, qPCR, RFLP, Sanger sequencing; parentage control using STR markers.

3. Reproductive Biotechnology

COC collection and evaluation; BCB test; in vitro maturation; sperm quality analysis; in vitro fertilization; embryo morphology assessment; farm visit (optional, e.g., ET procedure); use of modern methods for assessing the quality of mammalian sperm using the CASA system; demonstration of a system for micromanipulation of oocytes and mammalian embryos in the context of intracytoplasmic sperm injection (ICSI).

4. Ultrasound Diagnostics

Signal conversion and image processing; analysis of USG, MRI, CT, and confocal images.

5. Veterinary Prevention and Emergency Assistance

Interpretation of laboratory diagnostics (bacteriology, serology, PCR); visit to parasitology laboratory – avian coccidiosis.

Forms and criteria for completing the course	Percentage of a final grade
Written tests	O1, O2, O3, O4, O6, O8, 09
Oral presentations	O5, O7, 010, 011

Literature list

Core literature

1. Niemann H, Wrenzycki C (2018) Animal Biotechnology 1. Reproductive Biotechnologies. ISBN 978-3-319-92327-7 (e-book); Springer
2. DesCoteaux L, Colloton J, Gnemmi G. (2009) Practical Atlas Of Ruminant and Camelid Reproductive Ultrasonography. ISBN: 978-0-8138-1551-0; Wiley-Blackwell
3. Ewing W.N., Tucker L.A. (2008). The living GUT. 2nd edition. Nottingham University Press. Nottingham, United Kingdom. https://vdoc.pub/download/the-living-gut-7flc2l7f9g30
4. Conway, D. P., & McKenzie, M. E. (2007). Poultry coccidiosis: diagnostic and testing procedures. John Wiley & Sons. https://bankpoultry.com/upload/Public/maghale_240.pdf
5. Hartig SM (2013) Basic image analysis and manipulation in ImageJ. Current Protocols in Molecular Biology 14,122
6. McGeady T.A. (2005) "Veterinary Embryology" ISBN-13: 978-1405111478 Blackwell Publishing
7. Smith Thomas H (2009) The Cattle Health Handbook: Preventive Care, Disease Treatments & Emergency Proc. Heather Smith Thomas (1672) ASIN: B01FOD4NZ0 (https://www.vet-ebooks.com/the-cattle-health-handbook/)
8. Szczerbal I., Switonski M. (2016). Chromosome Abnormalities in Domestic Animals as Causes of Disorders of Sex Development or Impaired Fertility, Chapter 9 (pages 207-225), in: Insights from Animal Reproduction (Ed. R. Payan-Careira), InTech, Rijeka, Croatia. http://www.intechopen.com/books/insights-from-animal-reproduction)

Additional sources

9. Arczewska-Włosek A., Świątkiewicz S. (2015). The efficacy of selected feed additives in the prevention of broiler chicken coccidiosis under natural exposure to Eimeria spp. Annals of Animal Science. 15: 725-735
10. Józefiak D., Świątkiewicz S., Kierończyk B., Rawski M., Długosz J., Engberg R.M., Hojberg O. (2016). Clostridium perfringens challenge and dietary fat type modifies performance, microbiota composition and histomorphology of the broiler chicken gastrointestinal tract. Archiv fur Geflugelkunde. 80:1-14
11. Piliszek A, Madeja ZE (2018) Pre-implantation development of domestic animal. In: Cell fate in mammalian development, ed Plusa B, Hadjantonatis AK, Current topics in developmental biology. Volume 128, p. 267-294
12. Perkel KJ, Tscherner A, Merrill C, Lamarre J, Madan P (2015) The ART of selecting the best embryo: A review of early embryonic mortality and bovine embryo viability assessment methods. Mol Reprod Dev 82(11):822-38
13. Pereckienė A., Kaziūnaitė V., Vyšniauskas A., Petkevičius S., Malakauskas A., Šarkūnas M., Taylor M. A. (2007). A comparison of modifications of the McMaster method for the enumeration of Ascaris suum eggs in pig faecal samples. Veterinary parasitology, 149(1), 111-116.
14. Schindelin J, Arganda-Carreras I, Frise E, Kaynig V, Longair M., Pietzsch T, Cardona A (2012) Fiji - an Open Source platform for biological image analysis. Nature Methods, 9(7), 10.1038/nmeth.2019.