

## SYLLABUS (OF A COURSE/MODULE)

Course/module (as specified in the approved curriculum for the field of study) <b>Module-7 Preventive Veterinary Medicine</b>		ECTS  8	Catalogue number
Name in Polish <b>Profilaktyka weterynaryjna</b>			
Unit(-s) providing the course/module (Institute/Department) <b>Institute of Veterinary</b>			
Head of course/module <b>dr hab. Michał Jank</b>			
Field of study <b>Animal husbandry</b>	Level <b>2nd level studies</b>	Profile <b>General academic</b>	Semester <b>3</b>
Specialisation <b>Animal production management (Foreign students)</b>	MSc Specialisation <b>Animal production management (Foreign students)</b>		
<b>TYPE OF CLASSES/LECTURES AND THE NUMBER OF HOURS</b> (organised classes/lectures and self-study)			
Type of studies: full-time		Type of studies: extramural	
- lectures	40	- lectures	
- classes	85	- classes	
- Other tutored	30	-	
-		-	
-		-	
- Self-study	50	- Self-study	
Total number of hours:		205	Total number of hours:
<b>OBJECTIVE OF COURSE/MODULE</b>			
The aim of the module is to acknowledge the students with the current problems in veterinary prevention with a special focus on genetic and laboratory diagnostics, backgrounds of animal fertility and well as biotechnology of animal reproduction. After completion of the Module students should understand the basic of the cooperation between veterinarian and animal production manager in solving the most important health problems in animals and be able to use the newest technologies implemented into health management of produced animals.			
<b>TEACHING METHODS</b>			
Lectures – presentation with use of multimedia projectors Labs – computer lab, molecular genetics lab, on farm and veterinary diagnostic lab visits,			
<b>LEARNING OUTCOMES</b>		Reference to field outcomes	Reference to area outcomes
Knowledge	E1-has in-depth knowledge of genetics, organization and functioning of the genome, genetic diagnostics applied in animal breeding;	Z2A_W01	R2A_W01
	E2-has in-depth knowledge of laboratory research applied to livestock breeding and in production, processing and marketing of products of animal origin;	Z2A_W03, Z2A_W06	R2A_W03 R2A_W04
	E3-has in-depth knowledge on animal reproduction, including novel diagnostic techniques and methods:	Z2A_W08 Z2A_W09	R2A_W05 R2A_W06
	E4-has advanced knowledge on physiology of selected species appropriate for chosen scope of the study (specialty/specialization);	Z2A_W11 Z2A_W16	
	E5-knows multifaceted conditions of animal nutrition and its influence on the environment and animal welfare; including knowledge on novel technologies and techniques of animal nutrition sufficient to the chosen scope of the study (specialty/specialization);	InzA_W01 InzA_W02	
	E6-has in-depth knowledge on animal-environment interaction with special consideration of consequences for ecosystems and on developing and maintaining biodiversity of the natural environment;	InzA_W05	
	E7-has expertise relevant to the chosen field of study (specialty/specialization)		

Skills	<p>E8-finds, confronts, critically analyze and creatively processes various forms of information, in order to solve a specific problem or practical task in the field of study and specialization;</p> <p>E9-is able to present self-developed materials, its position and views through various forms of communication;</p> <p>E10-selects and uses modern information technologies in the analysis, interpretation and presentation of results;</p> <p>E11-plans and implements research tasks, project or scientific experiment in the field of animal husbandry, formulating the correct conclusions</p> <p>E12-has knowledge on the application of knowledge of genetics and on the possibilities of genetic diagnostics in the breeding practice is able to apply modern techniques and technologies in farming and animal breeding</p> <p>E13-suggests solutions involving genetic, environmental and technological factors enabling increased efficiency and welfare in animal breeding and improving the quality of products of animal origin</p> <p>E15-has language skills in line with the requirements for the level of B2+, with particular emphasis on vocabulary in the field of animal husbandry</p>	<p>Z2A_U01 Z2A_U02 Z2A_U03 Z2A_U04 Z2A_U06 Z2A_U07 Z2A_U10 Z2A_U14 InzA_U01 InzA_U03 InzA_U06 InzA_U07 InzA_U08</p>	<p>R2A_U01 R2A_U02 R2A_U03 R2A_U04 R2A_U05 R2A_U06 R2A_U07 R2A_U10</p>
Social competences	<p>E16-is aware of the need to learn throughout their lives and adapt to the needs of a competitive labor market, and can inspire such actions;</p> <p>E17-is able to competently participate in the discussion and determine priorities for the common solution to the problem;</p> <p>E18-is able to manage human resources and work independently and in the team over the ensuing problem;</p> <p>E19-recognizes and resolves the fundamental dilemmas associated with farming, breeding and use of animals</p>	<p>Z2A_K01 Z2A_K03 Z2A_K04 Z2A_K05 InzA_K01</p>	<p>R2A_K01 R2A_K03 R2A_K04</p>
<p><b>Methods to verify learning outcomes</b></p> <p>Written tests Participation in the classes Preparation of oral presentations</p>		<p>Outcome Reference Numbers</p> <p>E1-E19</p>	

## TEACHING CONTENT

### Lectures:

1. Genetic diagnostics in animal breeding (16 h):  
Cytogenetic diagnostics – techniques used in cytogenetic diagnostics: preparation of cytogenetic slides, chromosome banding, fluorescent in situ hybridization (FISH); Cytogenetic diagnostic – genome mutations and congenital malformations, including disorders of sex development; structural chromosome rearrangements and their impact on fertility; Molecular diagnostics – point mutations and their molecular effects, DNA polymorphism; genome wide association study (GWAS) in searching for causative mutations; Molecular diagnostics – molecular techniques: DNA isolation, PCR, DNA electrophoresis, DNA sequencing, SNP microarray; parentage testing with the use of microsatellite markers; Molecular diagnostics – molecular diagnosis of disorders of sex development; molecular diagnosis of hereditary diseases and congenital malformations; molecular detection of gene variants influencing on production traits
2. Embryology (8h):  
Introduction to embryology. Principles and processes of development; Principles of teratology. Developmental anomalies; Early development; Clavage: type of cleavage in vertebrates; Gastrulation in vertebrates; Development of extracellular membranes; Implantation and placentation; Development of primary organs: notochord, neural plate and somites
3. Reproductive biotechnology in farm animals (9h):  
The oocyte - oogenesis, evaluation of COC morphology, BCB test, in vitro maturation, oocytes as cell donors for animal cloning; The sperm cell - spermatogenesis, evaluation of sperm quality, sperm sorting by flow cytometry; The embryo - development of preimplantation embryos, quality evaluation, in vitro embryo production, embryo transfer ET, ICSI, embryo sexing, transgenesis;
4. Basics of veterinary toxicology (2h); Basics of veterinary pharmacology (5h)

### Practicals

1. Genetic diagnostics in animal breeding (14 h):  
Preparation of chromosome slides, microscopic identification of sex chromosomes, detection of sex chromosome (XX/XY) chimerism in freemartins; DNA isolation, qualitative and quantitative analysis of DNA isolates; PCR reaction and analysis of transcript levels by real-time PCR; Detection of mutations in DNA by RFLP and Sanger sequencing; Parentage control with the use of STR polymorphism
2. Embryology (12h):  
Light and electron microscopy technique used during the embryonic studies. (4h); Embryonic and fetal period in mammals. Embryonic period in birds. Description of external morphological features of embryos and fetuses. Determination of developmental stages; Embryology of endodermal organs. Development of the tongue, palate, stomach. The development of the small intestine (duodenum, jejunum, ileum) and large intestine (cecum, colon, rectum). The development of the gastrointestinal tract glands: liver and pancreas; Embryology of mesodermal organs. Development of the urinary tract (pronephros, mesonephros, metanephros, bladder, urethra). The development of the reproductive system (gonads, oviducts, vas deferens, external genitalia); Embryonic and fetal period in mammals. Embryonic period in birds. Description of external morphological features of embryos and fetuses. Determination of developmental stages.
3. Reproductive biotechnology in farm animals (15h):  
The oocyte - oogenesis, evaluation of COC morphology, BCB test, in vitro maturation, oocytes as cell donors for animal cloning; The sperm cell - spermatogenesis, evaluation of sperm quality, sperm sorting by flow cytometry; The embryo - development of preimplantation embryos, quality evaluation, in vitro embryo production, embryo transfer ET, ICSI, embryo sexing, transgenesis;
4. Basics of veterinary pharmacology (3h): Percent use of antibiotics in cattle, swine and poultry; Basics of veterinary toxicology (3h)
5. Elements of parasitology and invasiology (8h): Parasitology of swine; Avian coccidiosis
6. Pathology of reproduction (12h): On farm diagnostics of pregnancy; causes of reproductive failures; Basics of imaging diagnostics (7h); Basics of veterinary laboratory diagnostics – lab visit (5h); Biomedic data use on farms – (6h)

### Forms and criteria for passing of course/module

Three major written test (genetic diagnostics, embryology and animal reproduction) – each weighted as 30% of final grade Oral presentation (veterinary pharmacology, veterinary toxicology, diagnostic imaging) – each weighted as 3,33% of final grade	Weights for the final grade  100%
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### LIST OF LITERATURE

**Hsu W. Handbook of veterinary pharmacology. Wiley-Blackwell 2008**