

Module title:	Biotechnics in Cattle Reproduction	ECTS	2
Polish translation:	Biotechnika rozrodu bydła		
Course:	Veterinary Medicine		

Module language: English		Stage: JM-FVM	
Form of studies: ☒ intramural ☐ extramural	Type of module: ☐ basic ☒ directional	☐ mandatory ☒ elective	Semester: 11 ☒ winter semester ☐ summer semester
Academic year:		Intake 2021/2022	Catalogue number:

Module coordinator:	Prof. Zdzisław Gajewski Dr Sc , Krzysztof Papis Dr Sc			
Teachers responsible for the module:	Academic teachers of Center for Translational Medicine (CMT), PhD students, visiting professors and other specialists in the field of study.			
Assumptions, Goals, and Course Description	The aim of the course is to prepare students for the independent application of biotechnological methods in bovine reproduction under laboratory and field conditions. Students will become familiar with assisted reproduction methods widely used in clinical practice, such as artificial insemination, sperm sexing, and oocyte and embryo collection, as well as with further perspectives and opportunities related to reproductive biotechnology.			
Teaching forms, number of hours:	a) Lectures; hours 5; b) Clinical exercises; hours 25;			
Teaching methods:	Author's multimedia presentations; exercises using programs for analysis and processing of imaging studies, "case studies" based on images obtained by magnetic resonance and computed tomography and clinical data of patients, independent preparation of medical records. Discussion of cases, individual work. The method of organization of consultations will be determined by the course coordinator at the beginning of the semester.			
Formal prerequisites and initial requirements:	General knowledge of the physiology and pathology of bovine reproduction; ability to perform general and detailed examinations of the reproductive system in cows. Passed subjects: Animal Anatomy, Histology and Embryology, Animal Physiology, Pathophysiology, Clinical and Laboratory Diagnostics, Farm Animal Diseases – Farm Animal Reproduction.			
Learning effects	Course outcomes:		Learning outcomes relative to the course outcomes	Impact on the course outcomes*
Knowledge:	1	Student knows and understands the mechanisms and course of reproductive processes and their hormonal regulation in bovine reproduction.	B.W.1, B.W.3, B.W.4, B.W.5, B.W.6, B.W.12	2
	2	Student knows and understands the biology and hormonal regulation of growth and development of follicles and oocytes.	B.W.1, B.W.3, B.W.4, B.W.5, B.W.6, B.W.12	3
	3	Student knows and understands the principles and methods of embryo transfer and in vitro fertilization	B.W.1, B.W.3, B.W.4, B.W.5, B.W.6, B.W.12	2
Skills:	1	Student is able to assess the condition of the ovaries using an appropriate examination technique.	B.U.2, B.U.20, B.U.21	2
	2	Student is able to retrieve and evaluate oocytes.	B.U.3, B.U.7, B.U.13	3
	3	Student is able to apply the embryo transfer technique.	B.U.3, B.U.7, B.U.13	3
Competences:	1	Student has the willingness to work in a team, the ability to cooperate with animal owners and the State Veterinary Inspection.	KS.2, KS.3, KS.6, KS.7, KS.9	2
	2	Student has willingness to communicate with the animal owner.	KS.1	2
	3	Student shows initiative and skills in practical activities related to the execution and implementation of reproductive biotech methods in cattle reproduction.	KS.1	1
	4	Student has the willingness to update knowledge and act in accordance with the principles of veterinary deontology and animal welfare.	KS.2, KS.4	2
	5	The student has the competence to critically evaluate his/her knowledge and to use scientific sources and the willingness to supplement it and to share knowledge and competences with others.	KS.4, KS.6, KS.7, KS.8, KS.9, KS.12	2

Objectives of the module required to obtain learning effects:	Monograph lectures: The aim of the lectures is to familiarize students with the legal regulations governing the application of biotechnological methods in bovine reproduction and with the hormonal regulation of the ovarian cycle, with particular emphasis on the growth and maturation of ovarian follicles. The lectures will also cover the determinants of oocyte development and maturation, methods of oocyte evaluation, superovulation and estrous cycle synchronization, embryo evaluation and transfer, as well as in vitro fertilization and embryo production techniques. Clinical exercises: The exercises prepare students to apply methods for the diagnosis and control of ovarian function, preparation of donors and recipients, techniques for oocyte and embryo collection, methods for assessing oocyte and embryo quality, and techniques for embryo production and transfer. The collection, preparation for dilution, and preservation of bull semen are also covered, as well as the technology of frozen semen production.
Assessment methods:	Project, student activity in classes In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted.
Detail description of assessment methods; Formal documentation of learning outcome:	A requirement for passing the course is the student's attendance at the exercises and preparation of a project task. Evaluation of the project task based on compliance of the content with the assigned topic, correct inference, formulation of rational solutions, discussion and answers to questions. Evaluation of the degree of preparation and activity of the student in class. In the case of a top-down suspension of the realization of classes at the University and the need for remote/hybrid teaching, other forms of verification of learning outcomes are permitted in a manner adequate to the situation. Record into the eHMS system and documentation contained in the 'Course File' (i.e. student assessment cards, attendance lists, students' essays).
Elements impelling final grade:	A student who did not attend class and/or did not submit a project assignment will not obtain a pass. The final course grade is influenced by the following elements: - evaluation of the completion of the project task, - evaluation of the student's activity in classes.
Teaching base:	Classrooms, lecture halls, laboratories of CMT and FVM, laboratories, cattle farms and herds, assisted reproduction centers.
Mandatory and supportive materials : 1. Advances in Animal Biotechnology" Autorzy: Sinhh B., Mal G., Gautam S.K., Mukesh M. Wydawca: Springer Link, 2019 . 2. Cockcroft P. Bovine Medicine. 2015. John Wiley and Sons. 3. Ginther O.J. Ultrasonic imaging and animal reproduction. 1995. Library of University of Wisconsin. 4. Gordon I. Reproductive Technologies in Farm Animals. 2017. CABI 5. Green M. Dairy Herd Health. 2012. CABI Publishing. 6. Hafez B. Reproduction in farm animals. 2020. Lippincott Williams and Wilkins. 7. Horsfall T. Flint Ch.L. Milch Cows and Dairy Farming: comprising the breeds, breeding, and management in health and disease, of dairy. 2017. Hansebooks 8. Hulsen J.H.J.L., Lam T., Felius M. Stewart S. Udder Health: a practical guide to first-rate udder health. 2008. Roodbont Publishers B.V. 9. Peek S.F., Divers T.J. Diseases of dairy cattle. 2016. Elsevier. 10. Thomas. H. S. The Cattle Health Handbook. 2009. Storey Publishing, LLC. Relevant scientific publications including those of the module coordinator. ANNOTATIONS Protective uniform and individual protective equipment in accordance with accepted bio-assurance principles are mandatory during the exercise classes.	

* 3 – complete and detailed, 2 – moderate, 1 – basic.

Quantitative summary of the module:

Estimated number of work hours per student (contact and self-study) essential to achieve presumed learning outcomes of the module - base for quantifying ECTS:	50 h
Total ECTS points, accumulated by students during contact learning:	1 ECTS