Syllabus

Module title:	Diagnostic imaging of large animal	ECTS	2
Polish translation:	Diagnostyka obrazowa dużych zwierząt		
Course:	**Veterinary Medicine**		

Module language:	English				Stage: JM-FVM	
Form of studies:	■ intramural ☐ extramural	Type of module:	☐ basic ■ directional	■ mandatory ☐ elective	Semester: 7	■ winter semester ☐ summer semester
				Academic year:	Intake 2021/2022	Catalogue number:	FVM-V-JMSS-07W-D30_20

Module coordinator:	Tomasz Jasiński DVM, PhD
Teachers responsible for the module:	**Academic teachers of the Institute of Veterinary Medicine; Department of Large Animal Disease and Clinic; PhD students in accordance to the internal legal acts; visiting professors; other specialists in the field of study**
Objectives of the module:	The course aims to familiarize students with common techniques for imaging physiological and pathological changes occurring in farm animals and horses. Radiology offers veterinarians several tools that significantly extend diagnostic options. The course aims to prepare students for the proper selection of common imaging techniques and the possibility of clinical applications through active participation in imaging examinations performed using technical solutions commonly used in clinical diagnostics. The content of lecture education provides the theoretical basis for the content of training exercises, the main purpose of which is practical preparation, conduction, and results evaluation of common imaging techniques. Lectures (10x1 hour): 1. Ultrasound and Doppler ultrasound - imaging basics and clinical applications. 2. Endoscopy - basic imaging and clinical applications. 3. Basic diagnostic imaging - radiation protection, contrast radiology, digital radiology, basic imaging, and clinical applications. 4. Advanced diagnostic imaging - computed tomography, magnetic resonance imaging, scintigraphy - basic imaging and clinical applications. 5. Diagnostic imaging of the distal limb region - basic diagnostic imaging. 6. Diagnostic imaging of the distal limb region - advanced diagnostic imaging. 7. Diagnostic imaging of the proximal limb region - basic diagnostic imaging. 8. Diagnostic imaging of the proximal limb region - advanced diagnostic imaging. 9. Diagnostic imaging of the axial skeleton - basic diagnostic imaging. 10. Diagnostic imaging of the axial skeleton - advanced diagnostic imaging. Clinical exercises (10x2 hours): 1. Preparation, conduction, and results evaluation of ultrasound examination of the distal limb region. 2. Preparation, conduction, and results evaluation of ultrasound examination of the proximal limb region. 3. Preparation, conduction, and results evaluation of X-ray examination of the distal limb region. 4. Preparation, conduction, and results evaluation of X-ray examination of the proximal limb region. 5. Preparation, conduction, and results evaluation of CT and MRI examinations of the proximal limb region. 6. Preparation, conduction, and results evaluation of X-ray examination of head and spine. 7. Preparation, conduction, and results evaluation of CT examination of head and spine. 8. Preparation, conduction, and results evaluation of endoscopy and ultrasound examinations of the abdomen (gastrointestinal tract). 9. Preparation, conduction, and results evaluation of endoscopy, ultrasound, and X-ray examinations of the thoracic cavity (respiratory tract). 10. Preparation, conduction, and results evaluation of ultrasound and X-ray examinations of the thoracic cavity (cardiovascular system).
Teaching forms, number of hours:	a) Lectures; hours 10; b) Clinical classes; hours 20
Teaching methods:	Lectures: original multimedia presentations prepared by academic teachers; Clinical classes: preparing the patient for diagnostic imaging; positioning for diagnostic imaging; performing diagnostic imaging; analysis of imaging results; clinical cases presentation; discussion. Detailed schedule and organization of consultations will be defined by the coordinator of the course at the beginning of semester. Consultations 1 hr/week; the consultation schedule will be determined by the course coordinator at the beginning of the semester
Formal prerequisites and initial requirements:	Passing the courses: Animal Anatomy, Animal Physiology, Biophysics, Biochemistry, Veterinary pharmacology, and Pathomorphology.

Learning effects			Course outcomes:	Learning outcomes relative to the course outcomes	Impact on the course outcomes*
Knowledge:		1	Student knows the physical interactions used in common imaging modalities.	B.W.4, B.W.6	3
		2	Student knows the principles of preparing the patient for imaging under sedation and general anesthesia.	B.W.4, B.W.5	3
		3	Student knows the safety rules and procedures during the ultrasound examination.	B.W.4, B.W.6	3
		4	Student knows the safety rules and procedures during the X-ray examination including the rules of radiation protection and the use of contrast media.	B.W.4, B.W.6	3
		5	Student knows the rules and safety procedures during endoscopic examinations.	B.W.4, B.W.6	3
Skills:		1	Student can conduct an interview and a clinical trial aimed at selecting or excluding the use of common imaging techniques.	B.U.1, B.U.2, B.U.3	3
		2	Student can choose a common imaging technique for the clinical situation.	A.U.1, B.U.7	2
		3	Student can prepare the patient for ultrasound, X-ray, and endoscopic examination.	A.U.1, B.U.1, B.U.7, B.U.11	2
		4	Student can perform the ultrasound, X-ray, and endoscopic examination.	A.U.1, B.U.1, B.U.7	3
		5	Student can assess the results of the ultrasound, X-ray, CT, MRI, and endoscopic examination.	A.U.1, B.U.7	3
		6	Student can use scientific sources in assessing the results of an imaging study.	A.U.1, A.U.21, B.U.7, C.U.3	2
Competences:		1	Student is ready to choose a modern common technique based on specialist knowledge.	KS.1, KS.2, KS.5	3
		2	Student is aware of their knowledge and the benefits of using common imaging techniques.	KS.1, KS.2, KS.4, KS.5	2
		3	Student is aware of the need for continuing education and is ready to deepen his/her knowledge using scientific sources.	KS.4, KS.8	2
		4	Student acquires competence in cooperation with a radiologist in the selection and evaluation of the results of imaging examinations.	KS.3, KS.5, KS.6, KS.7, KS.9	3

Objectives of the module required to obtain learning effects:	Course aims to familiarize students with common techniques of imaging physiological and pathological changes occurring in farm animals and horses. Radiology offers veterinarians several tools that significantly extend diagnostic options. The course aims to prepare students for the proper selection of common imaging techniques and the possibility of clinical applications through active participation in imaging tests performed using technical solutions commonly used in clinical diagnostics.
Assessment methods:	Two writing tests and writing exam. 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:	The results of writing tests are pass (1) or fail (0). It is required to pass two writing tests to take the writing exam. Written exam in the form of 30 questions single-choice test. Detailed information on passing requirements: For 30 questions single-choice test, each answer is graded 0-1, max. 30 pts: 0 – 15 pts – failed (2) 16 – 18 pts – sufficient (3) 19 – 21 pts – sufficient plus (3.5) 22 – 24 pts – good (4) 25 – 27 pts – very good (4.5) 28 – 30 pts – excellent (5) No extra assessment methods are anticipated. Retake of the exam, in the same form as proper term. In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted. eHMS entry. Records collected in the course portfolio i.e. individual records of student results, presence lists, database of oral and written questions, written assessments of the students.
Elements impelling final grade:	Writing exam results: 100%
Teaching base:	Lecture rooms, ambulatory rooms, stable, x-ray room, CT room, MRI room at the Faculty of Veterinary Medicine.
Mandatory and supportive materials : Obligatory 1. Turek B.F., Domino M.A., Jasiński T.J. (2024) Equine Radiography: Handbook for Veterinary Medicine Students, Warsaw University of Life Sciences Press	

2. Butler J.A. et al. (2016) Clinical radiology of the horse 4th Edition, Wiley-Blackwell
3. Kidd J.A., Lu K.G., Frazer M.L. (2014) Atlas of Equine ultrasonography, Wiley-Blackwell
4. Thrall G. (2017) Textbook of Veterinary Diagnostic Radiology 7th Edition, Elsevier Urban & Partner

Supportive
1. Weaver M. et al. (2010) Handbook of Equine Radiography 1st Edition, Saunders Ltd.
2. Díaz G.M., et al. (2019) A Practical Guide to Equine Radiography, 5m Pubishing
3. Costa L.R.R., Paradis M.R. (2017) Manual of Clinical Procedures in the Horse, 1st Edition, Wiley-Blackwell
4. Kimberlin L. (2016) Atlas of Clinical Imaging and Anatomy of the Equine Head, John Wiley & Sons Inc
5. Schwarz T. (2011) Veterinary Computed Tomography, Iowa State University Press
6. Murray R.C. (2010) Equine MRI, John Wiley and Sons Ltd

Relevant scientific publications including those of the module coordinator.

ANNOTATIONS

* 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:	**60 h**
Total ECTS points, accumulated by students during contact learning:	**2 ECTS**