

Module title:	The basics of interpreting results in modern imaging techniques	ECTS	2
Polish translation:	Podstawy interpretacji wyników w nowoczesnych technikach obrazowania		
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:		Maria Sady PhD, DVM; Joanna Bajon PhD, DVM		
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		Imaging diagnostics represents one of the most rapidly growing branches of medicine, including veterinary medicine. With the progress of knowledge and technological development in veterinary medicine, the availability of imaging techniques such as magnetic resonance imaging and computed tomography has increased significantly, causing an increase in the number of specialists capable of correctly interpreting the obtained results that are a key part of the diagnostic pathway. The purpose of the course is to familiarize students with the current principles of medical image analysis, the basics of their interpretation and the creation of correct descriptions of the obtained results. One of the main objectives of the course is to work on real clinical cases of companion animals, which have been examined using a variety of diagnostic equipment such as magnetic resonances of different field strengths and tomograph scanners of different orders. By analyzing the results from multiple devices, the student will gain a wide range of knowledge of the available imaging methods. The student will also acquire the ability to independently prepare medical records both in the context of preparing a referral for an imaging study, as well as describing the result of the study.		
Teaching forms, number of hours:		a) Clinical exercises; hours 30;		
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. Detailed schedule will be defined by the coordinator of the course at the beginning of semester. Detailed organization of consultations will be defined by the coordinator of the course at the beginning of semester.		
Formal prerequisites and initial requirements:		Passed subjects: Animal anatomy, Comparative anatomy, Animal physiology, Biophysics, Animal pathophysiology, Pathomorphology, Clinical and laboratory diagnostics, Advanced imaging techniques. The student should have the knowledge and skills obtained during the completion of the course subjects.		
Learning effects		Course outcomes:	Learning outcomes relative to the course outcomes	Impact on the course outcomes*
Knowledge:	1	The student knows the terminology used in medical imaging.	B.W6	3
	2	The student knows the principles of analysis and interpretation of medical images.	B.W4, B.W5, B.W6	Each 2
	3	The student knows the physical basis of modern imaging methods.	B.W4, B.W6	Each 3
	4	The student knows the principles of preparing medical documentation in terms of diagnostic imaging.	B.W6	3
Skills:	1	The student is able to select imaging technique for medical indications.	B.U3, B.U13	Each 2
	2	The student is able to prepare a description of a diagnostic examination.	B.U3, B.U6, B.U7	Each 3
	3	The student is able to interpret the results of imaging studies.	B.U6	3
	4	The student is able to formulate conclusions on the basis of the examination results.	B.U13	2
Competences:	1	The student is able to select the imaging method on the basis of specialized knowledge.	KS.5	2
	2	The student is aware of the necessity of continuous education and is ready to deepen his knowledge using scientific sources.	KS.4, KS.8	Each 3
	3	The student is competent to cooperate with other doctors in the field of diagnostic imaging.	KS.9, KS.11	Each 3

Objectives of the module required to obtain learning effects:	Clinical Exercises: 1. Introduction to medical image analysis (including physical basics of imaging methods, computer formats used in image analysis, methods of archiving medical imaging, computer programs used in image analysis, performance of multiplanar and volumetric reconstructions, hardware requirements, methods of processing medical images, evaluation of diagnostic utility of obtained examination results, artifacts, preparation of the patient for the examination vs. quality of obtained images). 2. Analysis and interpretation of imaging studies of the brain and cranium in magnetic resonance imaging (including normal anatomy; selected pathological changes of bone structures, pathologies in the area of the nasal cavity and paranasal sinuses, abnormalities of the central nervous system). 3. Analysis and interpretation of imaging studies of the cerebrocranium by computed tomography (including normal anatomy; post-traumatic lesions of the skull; selected anatomical anomalies, tumors of the cerebrocranial area, diseases involving the bulla tympanica). 4. Analysis and interpretation of imaging studies of the spine by computed tomography (including normal anatomy, anatomical defects of the vertebrae, traumatic lesions, myelography, intervertebral disc disease). 5. Analysis and interpretation of imaging studies of the spine and spinal cord by magnetic resonance imaging (including normal anatomy; inflammatory diseases of the spinal cord; selected congenital defects, neoplasms, intervertebral disc disease). 6. Clinical case analysis with the development of a final report in the form of a complete description of the imaging study.
Assessment methods:	Evaluation of the project task, evaluation of 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:	Evaluation of the project task (description of the indicated imaging study) 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. Written papers - project task - description of the indicated imaging study. 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 has not obtained a minimum acceptable number of points or not submit a project task does not obtain credit for the course. The final course grade is influenced by the following elements: - evaluation of completion of the project task, - evaluation of student activity in class.
Teaching base:	Classrooms, lecture halls and laboratories of CMT and FVM, diagnostic imaging centers.
Mandatory and supportive materials : 1. „Textbook of Veterinary Diagnostic Radiology“, D. E. Thrall, Elsevier, 2018. 2. „Veterinary Computed Tomography“, T. Schwarz, J. Saunders J. Wiley-Blackwell, 2011. 3. „Atlas of Small Animal CT and MRI“, E. Wisner, A. Zwingenberger, Wiley-Blackwell, 2015. 4. „Diagnostic MRI in dogs and cats“, W. Mai, CRC Press, 2018. 5. „Handbook of Small Animal MRI“, I. Elliott, G. Skerritt, Wiley-Blackwell, 2010. 6. 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:	50h
Total ECTS points, accumulated by students during contact learning:	2 ECTS