

Module title:	Diagnostic imaging of small animal	ECTS	3
Polish translation:	Diagnostyka obrazowa małych zwierząt		
Course:	Veterinary Medicine		

Module language: English		Stage: JM-FVM	
Form of studies: <input checked="" type="checkbox"/> intramural <input type="checkbox"/> extramural	Type of module: <input type="checkbox"/> basic <input checked="" type="checkbox"/> directional	<input checked="" type="checkbox"/> mandatory <input type="checkbox"/> elective	Semester: 7 <input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester
Academic year:		Intake 2021/2022	Catalogue number: FVM-V-JMSS-07W-D29_20

Module coordinator:	Małgorzata Domino DVM, PhD, DSc
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:	<p>The course aims to familiarize students with common techniques for imaging physiological and pathological changes occurring in small animals. 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.</p> <p><u>Lectures (15x1 hour):</u></p> <ol style="list-style-type: none"> 1. Basics of radiological examination of small animals. Construction of X-ray tube. Radiation protection. Safety in radiology lab. X-ray image formation and interpretation. 2. Basics of computed tomography (CT) and magnetic resonance (MR) imaging. Construction of CT scanner and MRI scanner. Radiation protection. Safety in CT and MRI lab. CT and MRI image formation and interpretation. 3. Diagnostic imaging of head - skull, oral cavity, dental diseases. 4. Diagnostic imaging of head and neck- nasal cavities, sinuses, larynx, trachea. 5. Diagnostic imaging of spine. Myelography - contrast imaging. 6. Diagnostic imaging of thorax - Bronchi and lung radiodiagnosis. 7. Diagnostic imaging of thorax - Diaphragm, mediastinum, and pleural cavity radiodiagnosis. 8. Diagnostic imaging of thorax - Heart and blood vessels radiodiagnosis. 9. Diagnostic imaging of abdomen - Gastrointestinal tract radiodiagnosis. Contrast gastrointestinal tract examination. 10. Diagnostic imaging of abdomen - Glands radiodiagnosis. 11. Diagnostic imaging of abdomen - Urinary tract radiodiagnosis. Urography - contrast imaging. 12. Diagnostic imaging of abdomen - Reproductive tract radiodiagnosis. 13. Diagnostic imaging of limbs - Bone structure and trauma. 14. Diagnostic imaging of limbs - Bone diseases radiodiagnosis. 15. Diagnostic imaging of limbs - Joint diseases radiodiagnosis. <p><u>Clinical exercises (15x3 hours):</u></p> <ol style="list-style-type: none"> 1. Preparation, conduction, and results evaluation of X-ray examination of the head. 2. Preparation, conduction, and results evaluation of X-ray examination of the spine. 3. Preparation, conduction, and results evaluation of X-ray examination of the thoracic limb. 4. Preparation, conduction, and results evaluation of X-ray examination of the pelvic limb. 5. Preparation, conduction, and results evaluation of X-ray examination of the thorax. 6. Preparation, conduction, and results evaluation of X-ray examination of the abdomen. 7. Preparation, conduction, and results evaluation of CT imaging of the head and spine. 8. Preparation, conduction, and results evaluation of CT imaging the thorax and abdomen. 9. Preparation, conduction, and results evaluation of MR imaging the head. 10. Preparation, conduction, and results evaluation of MR imaging the spine. 11. Preparation, conduction, and results evaluation of ultrasound examination of the gastrointestinal tract. 12. Preparation, conduction, and results evaluation of ultrasound examination of the urinary tract and glands. 13. Preparation, conduction, and results evaluation of ultrasound examination of the reproductive tract and soft tissues. 14. Preparation, conduction, and results evaluation of ultrasound examination of the cardiovascular and respiratory systems. 15. Basics of sedation and anesthesia for small animals diagnostic imaging.
Teaching forms, number of hours:	<ol style="list-style-type: none"> a) Lectures; hours 15; b) Clinical classes; hours 45

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.6	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 and CT examinations including the rules of radiation protection and the use of contrast media.	B.W.4, B.W.6	3
	5	Student knows the safety rules and procedures during the MRI examination including the rules for the use of contrast media.	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.	A.U.21, B.U.7	2
	2	Student can choose a common imaging technique for the clinical situation.	A.U.21, B.U.7	2
	3	Student can prepare the patient for ultrasound, X-ray, CT, and MRI examinations.	A.U.21, B.U.7	2
	4	Student can conduct ultrasound, X-ray, CT, and MRI examinations.	A.U.21, B.U.7	2
	5	Student can assess the results of the ultrasound, X-ray, CT, and MRI examinations.	A.U.21, B.U.7	2
	6	Student can use scientific sources in assessing the results of an imaging study.	A.U.21, B.U.7	2
Competences:	1	Student is ready to choose a modern common technique based on specialist knowledge.	KS.1, KS.5, KS.4, KS.8, KS.9, KS.10	2
	2	Student is aware of their knowledge and the benefits of using common imaging techniques.	KS.1, KS.5, KS.4, KS.8, KS.9, KS.10	2
	3	Student is aware of the need for continuing education and is ready to deepen his/her knowledge using scientific sources.	KS.1, KS.5, KS.4, KS.8, KS.9, KS.10	2
	4	Student acquires competence in cooperation with a radiologist in the selection and evaluation of the results of imaging examinations.	KS.1, KS.5, KS.4, KS.8, KS.9, KS.10	2
Objectives of the module required to obtain learning effects:	The aim is to acquire knowledge and master the skills of assessing images, familiarizing students with conventional X-ray examinations, and presenting issues related to modern and advanced imaging techniques such as CT and MRI of small animals. The program is conducted in the form of lectures, and practical classes. Theoretical knowledge in the field of performing X-ray tests, basic concepts in physics, and radiation protection is transmitted. Practical classes include both the correct positioning of the patient for the examination, performing the appropriate imaging, and the final assessment of the obtained images.			
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)			

	<p>No extra assessment methods are anticipated. Retake of the exam, in the same form as proper term.</p> <p>In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted.</p> <p>eHMS entry.</p> <p>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.</p>
Elements impelling final grade:	Writing exam results: 100%
Teaching base:	Lecture rooms, ambulatory rooms, x-ray room, room with negatoscopes, CT room, MRI room at the Faculty of Veterinary Medicine.
Mandatory and supportive materials :	
<p>Obligatory</p> <ol style="list-style-type: none"> 1. Thrall D., Robertson I. (2023) Atlas of Normal Radiographic Anatomy and Anatomic Variants in the Dog and Cat, Elsevier 2. Coulson A., Lewis N. (2008) An Atlas of Interpretative Radiographic Anatomy of the Dog and Cat, Wiley-Blackwell 3. Wisner E., Zwingenberger A. (2015) Atlas of Small Animal CT and MRI, Wiley-Blackwell 4. Lisciandro G.R. (2008) Point-of-Care Ultrasound Techniques for the Small Animal Practitioner, 2nd Edition, Wiley-Blackwell <p>Supportive</p> <ol style="list-style-type: none"> 1. Mannion P. (2008) Diagnostic Ultrasound in Small Animal Practice, Wiley-Blackwell 2. Penninck D., D'Anjou M.A. (2015) Atlas of Small Animal Ultrasonography, 2nd Edition, Wiley-Blackwell 3. Elliott I., Skerritt G. (2013) Handbook of Small Animal MRI, Wiley-Blackwell 4. Wolvekamp P. (2005) Atlas of Radiology of the Traumatized Dog and Cat, Schlütersche 5. Thrall E. (2020) Textbook of Veterinary Diagnostic Radiology, Saunders 6. DuPont G.A., DeBowes L.J. (2008) Atlas of Dental Radiography in Dogs and Cats, Saunders <p>Relevant scientific publications including those of the module coordinator.</p>	
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:	90 h
Total ECTS points, accumulated by students during contact learning:	3 ECTS