Module code	M_WE_SEM7 DIAG OB
Field of study	Veterinary medicine
Module name, also the name in English	Diagnostic imaging
	Diagnostyka obrazowa
Language of instruction	English
Module type	(mandatory/optional)
Level of studies	Long-cycle master's degree studies
Form of study	Full-time
Year of study in the field of study	IV
Semester of study in the field of study	VII
ECTS credits, divided into contact/non-contact hours	4 (2.4/1.6)
Academic title/degree, name of the person responsible for the module	Dr n. wet. Renata Komsta
Unit teaching the module	Laboratory of Radiology and Ultrasonography
Module objective	Learning the techniques of various diagnostic imaging methods, the basics of analysing X-ray, ultrasound and tomographic images and endoscopic examinations, as well as the principles of radiological protection within the hour limit specified. Learning how to select an appropriate diagnostic imaging method and interpret the results obtained in various disease states in a variety of animal species.
The learning outcomes for the module include a description of the knowledge, skills and social competences that the student will gain after completing the module.	Knowledge:
	K1 the student knows the principles of radiological protection
	K2 the student knows the physical basis of radiographic, tomographic and ultrasound image formation
	K3 the student has acquired the knowledge needed to assess the results of X-ray and ultrasound examinations and make the diagnosis, taking into account the differential diagnosis
	Skills:
	S1 the student can correctly interpret the results of imaging examinations and formulate a diagnosis, taking into account the differential diagnosis
	S2 the student demonstrates the ability to use diagnostic equipment, including radiography and ultrasonography
	S3 the student can prepare clear descriptions of cases and maintain records, in accordance with applicable regulations, in a form that is understandable to the animal owner and readable by other veterinarians
	Social competences:
	Sc1 the student shows independence in action, can formulate own opinions, accepts responsibility for decisions, is aware of their impact on human and animal health within the scope of diagnostic imaging
	Sc2 the student can set priorities for the implementation of tasks, correctly identifies and resolves dilemmas associated with diagnostic imaging, and behaves in accordance with the principles of ethics and veterinary deontology

	Sc3 the student is aware of his or her own limitations, understands the need for constant education and self-improvement in diagnostic imaging
Prerequisites and additional requirements	according to the sequester resolution
Module program content	Lectures: Formation and properties of X-rays, formation and types of radiographic images. Basic principles of tomographic image formation. Types of tomographic appliances. Image formation, artifacts in ultrasound examination. Endoscopic examination – instrumentation and preparing patients for examination. Radiological imaging of bones during osteogenesis and after skeletal maturity, the theoretical basis of unit changes in bones, principles of diagnosing diseases of osteogenesis period and after skeletal maturity. Radiologic imaging of joints. Principles of X-ray examination and images of normal organs in the chest and abdominal cavity. Contrast examination methods. Practical classes: Radiological protection; X-ray machine type and design; Preparing patients for tomographic examination; Basics of tomographic image interpretation. Basic principles of endoscopic examination; Basic principles of abdominal ultrasound examination and diagnosis of pathological changes in the abdominal cavity. Advantages and limitations of, indications and contraindications to performing particular diagnostic imaging techniques. Documenting the examinations conducted. Bone fracture and healing, osteoarthritis and bone tumours, degenerative diseases of bones and joints. Diseases of the osteogenesis period. Interpretation of pathologic changes in the chest and abdominal cavity.
List of core and supplementary literature	1. "Diagnostyka radiologiczna i ultrasonograficzna psów i kotów" J. K. Kealy, H. McAllister, Urban & Partner, Wrocław 2011 2. Thrall D. E. (Edit.); eds. 1st edition S. Koper: "Diagnostyka radiologiczna w weterynarii", Elsevier, Urban & Partner, Wrocław 2010. 3. Coulson A., Lewis N. – "Atlas of Interpretative Radiographic Anatomy of the Dog and Cat", Blackwell Science, 2002. 4. Gorczyca R., Wiśniewski K., Pochocki K., Różycki Z. – "Ochrona radiologiczna w pracowni rentgenowskiej", Ex – polon, Warszawa, 1997 5. Waibl H., Mayrhofer E., Matis U.Brunnberg L., Kostlin R. – "Atlas anatomii radiograficznej psa", Galaktyka, 2014 6. Waibl H., Mayrhofer E., Matis U.Brunnberg L., Kostlin R. – "Atlas anatomii radiograficznej kota", Galaktyka, 2016
Planned forms/activities/teaching methods	Lectures, multimedia presentations, practical classes, discussion, oral exam

Verification methods and ways of documenting the achieved learning outcomes.	During the module, at the beginning of each laboratory class, students are expected to answer questions (3 questions, including one on the evaluation of radiological images; the grades are as follows: 2 – all answers incorrect or an incorrect answer related to the principles of radiological protection, 3 – one incorrect answer and two answers that are at least 60% correct, 4 – 3 answers that are at least 60% correct, or one incorrect and 2 fully correct answers, 5 – 3 fully correct answers); alternatively, a test may be given: (2 – score below 60% or an incorrect answer in the X-ray exposure safety part, 3 – 61-68%, 3.5 – 69-76%, 4 – 77-84%, 4.5 – 85-92%, 5 – above 93%). Additionally, a written progress test on the physics portion will be given (test: 2 – score below 60% or an incorrect answer in the x-ray exposure safety portion, 3 – 61-68%, 3.5 – 69-76%, 4 – 77-84%, 4.5 – 85-92%, 5 – above 93%), The prerequisite for taking the exam is passing the test, getting a positive average grade, calculated based on the test and any current progress tests, as well as attending 85% of the classes. The exam consists of an oral theoretical part and a practical part. A passing grade in the theoretical part is a prerequisite for taking the practical part. The theoretical part is graded as follows: 2 – score below 60%, 3 – 61-68%, 3.5 – 69-76%, 4 – 77-84%, 4.5 – 85-92%, 5 – above 93% Evaluation of the practical part: 5 – correct assessment of 5 radiographs by the student on their own, 4 – correct assessment of 4 radiographs by the student on their own and 1 with the examiner's assistance, 3 – correct assessment of 3 radiographs by the student on their own and 2 with the examiner's assistance, 2 – incorrect assessment of 2 radiographs despite hints given by the examiner. The exam grade is an average of obtained component grades (from the theoretical and practical parts)

ECTS credits	Form of classes	Number of contact hours
	Lectures	30
	Laboratory classes	20
	Recitation classes	10
	Component grades	6
	Consultations	4
	Examination	2
	Total	72
		Number of non-contact hours
	Preparation for laboratory classes	13
	Development of class reports	13
	Preparation for the exam	22
	Total	48 hrs
	Total	120 hrs

The workload of activities that requires direct participation of an academic teacher	Lectures – 30 hours. Practical classes – 30 hours. (20 hours lab classes + 10 hours recitation classes) Component grades – 6 hours Consultations – 4 hours Exam – 2 hours Total: 72 hours, corresponding to 2.4 ECTS credits.
Relation of module learning outcomes to course learning outcomes.	W1, W2 – WE_ W-OTHER +++, W3 – WE_W18++, U1 – WE_U-OTHER ++ U2 – WE_U20++, U3 – WE_U3+, K1 – WE_K13+, K2 – WE_K8+, K3 – WE_K6 +, WE_K7+,
Elements and values affecting the final grade	Final evaluation of the practical classes: a positive average grade calculated based on the test and current progress tests. The exam grade is calculated based on: Grades from the theoretical part of the exam (50% weight) and the practical part of the exam (50% weight)