SZKOŁA GŁÓWNA GOSPODARSTWA WIEJSKIEGO

Diagnostic imaging of large animals

Educational subject description sheet

Basic information

Field of study Veterinary Medicine	**Didactic cycle** 2024/25
Speciality -	**Subject code** WETFVMS_D.540K.01718.24
Organizational unit Faculty of Veterinary Medicine	**Lecture languages** english
Study level long-cycle	**Mandatory** Obligatory subjects
Study form full-time studies	**Block** Major subjects
Education profile General academic	**Disciplines** Veterinary medicine

Coordinator	Małgorzata Domino
Teacher	Małgorzata Domino, Tomasz Jasiński, Katarzyna Skierbiszewska, Małgorzata Wierzbicka, Natalia Kozłowska, Kamil Górski

Period	**Examination**	**Number of ECTS points**
Semester 7	Pass with grade **Activities and hours** Lecture: 10 Clinical classes: 20	2

Goals

Code	Goal
C1	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.

Entry requirements

Biophysics, Topographic anatomy, Veterinary pharmacology 2, General surgery and anesthesiology, Clinical and laboratory diagnostics 2, Pathomorphology 1

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	the physical interactions used in common imaging methods.	B.W4, B.W6	Written credit, Test (written or computer based)
W2	the principles of preparing the patient for imaging under sedation and general anesthesia.	B.W4, B.W5	Written credit, Test (written or computer based)
W3	the safety rules and procedures during the ultrasound examination.	B.W4, B.W6	Written credit, Test (written or computer based)
W4	the safety rules and procedures during the X-ray examination including the rules of radiation protection and the use of contrast media.	B.W4, B.W6	Written credit, Test (written or computer based)
W5	the rules and safety procedures during endoscopic examinations.	B.W4, B.W6	Written credit, Test (written or computer based)
Skills – Student can:			
U1	conduct an interview and a clinical trial aimed at selecting or excluding the use of common imaging techniques.	B.U1, B.U2, B.U3	Written credit, Test (written or computer based)
U2	choose a common imaging technique for the clinical situation.	B.U7	Written credit, Test (written or computer based)
U3	prepare the patient for ultrasound, X-ray, and endoscopic examination.	B.U1, B.U11, B.U7	Written credit, Test (written or computer based)
U4	perform the ultrasound, X-ray, and endoscopic examination.	B.U1, B.U7	Written credit, Test (written or computer based)
U5	assess the results of the ultrasound, X-ray, CT, MRI, and endoscopic examination.	B.U7	Written credit, Test (written or computer based)

Code	Outcomes in terms of	Effects	Examination methods
U6	use scientific sources in assessing the results of an imaging study.	B.U7	Written credit, Test (written or computer based)
Social competences – Student is ready to:			
K1	choose a modern common technique based on specialist knowledge.	KS.1, KS.2, KS.5	Written credit, Test (written or computer based)
K2	evaluation of his knowledge and the benefits of using common imaging techniques.	KS.1, KS.2, KS.4, KS.5	Written credit, Test (written or computer based)
K3	continue education and is ready to deepen his/her knowledge using scientific sources.	KS.4, KS.8	Written credit, Test (written or computer based)
K4	cooperate with a radiologist in the selection and evaluation of the results of imaging examinations.	KS.3, KS.5, KS.6, KS.7, KS.9	Written credit, Test (written or computer based)

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	Ultrasound and Doppler ultrasound - imaging basics and clinical applications.	W1, W2, W3, K1, K2	Lecture
2.	Endoscopy - basic imaging and clinical applications.	W1, W2, W5, K1, K2	Lecture
3.	Basic diagnostic imaging - radiation protection, contrast radiology, digital radiology, basic imaging, and clinical applications.	W1, W2, W4, K1, K2	Lecture
4.	Advanced diagnostic imaging - computed tomography, magnetic resonance imaging, scintigraphy - basic imaging and clinical applications.	W1, W2, W4, K1, K2, K3, K4	Lecture
5.	Diagnostic imaging of the distal limb region - basic diagnostic imaging.	W3, W4, K1, K2, K3, K4	Lecture
6.	Diagnostic imaging of the distal limb region - advanced diagnostic imaging.	W4, K1, K2, K3, K4	Lecture
7.	Diagnostic imaging of the proximal limb region - basic diagnostic imaging.	W3, W4, K1, K2, K3, K4	Lecture
8.	Diagnostic imaging of the proximal limb region - advanced diagnostic imaging.	W4, K1, K2, K3, K4	Lecture
9.	Diagnostic imaging of the axial skeleton - basic diagnostic imaging.	W3, W4, K1, K2, K3, K4	Lecture
10.	Diagnostic imaging of the axial skeleton - advanced diagnostic imaging.	W4, K1, K2, K3, K4	Lecture
11.	Preparation, conduction, and results evaluation of ultrasound examination of the distal limb region.	W3, U1, U2, U3, U4, U5, U6	Clinical classes
12.	Preparation, conduction, and results evaluation of ultrasound examination of the proximal limb region.	W3, U1, U2, U3, U4, U5, U6	Clinical classes

No.	Course content	Subject's learning outcomes	Activities
13.	Preparation, conduction, and results evaluation of X-ray examination of the distal limb region.	W4, U1, U2, U3, U4, U5, U6	Clinical classes
14.	Preparation, conduction, and results evaluation of X-ray examination of the proximal limb region.	W4, U1, U2, U3, U4, U5, U6	Clinical classes
15.	Preparation, conduction, and results evaluation of CT and MRI examinations of the distal limb region.	W4, U1, U2, U5, U6	Clinical classes
16.	Preparation, conduction, and results evaluation of X-ray examination of head and spine.	W4, U1, U2, U3, U4, U5, U6	Clinical classes
17.	Preparation, conduction, and results evaluation of CT examination of head and spine.	W4, U1, U2, U5, U6	Clinical classes
18.	Preparation, conduction, and results evaluation of endoscopy and ultrasound examinations of the abdomen (gastrointestinal tract).	W3, W5, U1, U2, U3, U4, U5, U6	Clinical classes
19.	Preparation, conduction, and results evaluation of endoscopy, ultrasound, and X-ray examinations of the thoracic cavity (respiratory tract).	W3, W4, W5, U1, U2, U3, U4, U5, U6	Clinical classes
20.	Preparation, conduction, and results evaluation of ultrasound and X-ray examinations of the thoracic cavity (cardiovascular system).	W3, W4, W5, U1, U2, U3, U4, U5, U6	Clinical classes

Course advanced

Activities	Methods of conducting classes
Lecture	Lecture
Clinical classes	Inference, Mastery of movement and stabilization of the technique, Teaching technique in the form of play, exact, task, Error correction, Teamwork, Individual work, Interpreting the results, Observation, Field observations

Activities	Examination method	Percentage
Lecture	Test (written or computer based)	50%
Clinical classes	Written credit	50%

Activities	Credit conditions
Lecture	The maximum number of points to be obtained is 100 points. A grade is given according to the criteria: <51 - 2; 52-60 - 3, 61-70 - 3+, 71-80 - 4; 81-90 - 4+; > 91 - 5. A student who has not obtained the specified minimum acceptable number of points from the evaluation of exam does not obtain credit for the course.
Clinical classes	The maximum number of points to be obtained is 100 points. A grade is given according to the criteria: <51 - 2; 52-60 - 3, 61-70 - 3+, 71-80 - 4; 81-90 - 4+; > 91 - 5. A student who has not obtained the specified minimum acceptable number of points from the evaluation of exam does not obtain credit for the course.

Literature

Obligatory

1. Butler J.A. et al. (2008) Clinical radiology of the horse 3rd Edition, Wiley-Blackwell
2. Kidd J.A., Lu K.G., Frazer M.L. (2014) Atlas of Equine ultrasonography, Wiley-Blackwell
3. Thrall G. (2017) Textbook of Veterinary Diagnostic Radiology 7th Edition, Elsevier Urban & Partner

Optional

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

Calculation of ECTS points

Activity form	**Activity hours***
Lecture	10
Clinical classes	20
Preparation for the exam	10
Preparation for exercises	10
Self-study on the content covered in class	10
Student workload	**Hours** 60
Number of ECTS points	**ECTS** 2

* hour means 45 minutes

Effects

Code	Content
KS.1	Absolwent jest gotów do wykazywania odpowiedzialności za podejmowane decyzje wobec ludzi, zwierząt i środowiska przyrodniczego
KS.2	Absolwent jest gotów do prezentowania postawy zgodnej z zasadami etycznymi i podejmowania działań w oparciu o kodeks etyki w praktyce zawodowej oraz do wykazywania tolerancji dla postaw i zachowań wynikających z odmiennych uwarunkowań społecznych i kulturowych
KS.3	Absolwent jest gotów do udziału w rozwiązywaniu konfliktów, a także wykazywania się elastycznością w reakcjach na zmiany społeczne
KS.4	Absolwent jest gotów do korzystania z obiektywnych źródeł informacji
KS.5	Absolwent jest gotów do formułowania wniosków z własnych pomiarów lub obserwacji
KS.6	Absolwent jest gotów do formułowania opinii dotyczących różnych aspektów działalności zawodowej
KS.7	Absolwent jest gotów do rzetelnej samooceny, formułowania konstruktywnej krytyki w zakresie praktyki weterynaryjnej, przyjmowania krytyki prezentowanych przez siebie rozwiązań, ustosunkowywania się do niej w sposób jasny i rzeczowy, także przy użyciu argumentów odwołujących się do dostępnego dorobku naukowego w dyscyplinie
KS.8	Absolwent jest gotów do pogłębiania wiedzy i doskonalenia umiejętności
KS.9	Absolwent jest gotów do komunikowania się ze współpracownikami i dzielenia się wiedzą
B.U1	Absolwent potrafi bezpiecznie i humanitarnie postępować ze zwierzętami oraz instruować innych w tym zakresie
B.U2	Absolwent potrafi przeprowadzić wywiad lekarsko-weterynaryjny w celu uzyskania dokładnej informacji o pojedynczym zwierzęciu lub grupie zwierząt oraz jego lub ich środowisku bytowania
B.U3	Absolwent potrafi przeprowadzać pełne badanie kliniczne zwierzęcia
B.U7	Absolwent potrafi stosować aparaturę diagnostyczną, w tym radiologiczną, ultrasonograficzną i endoskopową, zgodnie z jej przeznaczeniem i zasadami bezpieczeństwa dla zwierząt i ludzi oraz interpretować wyniki badań uzyskane po jej zastosowaniu
B.U11	Absolwent potrafi stosować metody bezpiecznej sedacji, ogólnego i miejscowego znieczulenia oraz oceny i łagodzenia bólu
B.W4	Absolwent zna i rozumie zasady postępowania diagnostycznego, z uwzględnieniem diagnostyki różnicowej, oraz postępowania terapeutycznego
B.W5	Absolwent zna i rozumie zasady przeprowadzania badania klinicznego i monitorowania stanu zdrowia zwierząt
B.W6	Absolwent zna i rozumie sposób postępowania z danymi klinicznymi i wynikami badań laboratoryjnych i dodatkowych