Code of subject	M WE_SEM 4 FIZJO 2
Field of study	Veterinary medicine
Name of the training module including the Polish name	Animal physiology 2 Fizjologia zwierząt 2
Language of instruction	English
Type of the training module	obligatory
Level of the training module	Master level
Form of studies	Full-time
Location in the programme (year)	II
Location in the programme (semester)	4
ECTS credits together contact / non-contact hours	6 (3,0/3,0)
Name and surname of the person in charge:	Prof. dr hab. Ewa Tomaszewska
Unit offering the subject	Department of Animal Physiology
Aim of the module	The aim of the module is to introduce students to the mechanisms of functioning of the animal body and the regulation of these mechanisms, with particular emphasis on the metabolic processes responsible for maintaining homeostasis of the body.
Learning outcomes –	Knowledge:
	K1. the student knows the physiological mechanisms of feeling and perception, the physiological mechanism of behavior; endocrinology, thermoregulation, physiological processes and mechanisms of physiological regulation of the circulatory, respiratory, excretory and reproductive systems at the level of cells, tissues, organs and their interactions, dependencies and integration at the level of the body
	K2. the student knows the methods of examination and the values of temperature and the basic parameters of the circulatory, respiratory, excretory and reproductive systems that determine the physiological state of the body, taking into account species differences
	Skills:
	S1. the student is able to explain the physiological thermoregulatory mechanisms and the mechanisms of functioning of cells / organs / systems such as sensory organs, circulatory, respiratory, excretory and reproductive systems with an indication of interspecies differences, and is able to explain the influence of various environmental factors
	S2. the student is able to indicate, measure and interpret the temperature and basic parameters describing the physiological state of the circulatory, respiratory, excretory and reproductive systems as indicators of the animal's health
	Social competence:
	Sc1. the student is ready to assess the parameters of the physiological state of the body and is aware of its importance for health, animal production and the quality of food of animal origin
	Sc2. the student is ready to constant learning and search for the knowledge of the impact of various factors on the functioning of the animal organism

	Sc3. the student is ready to perform basic physiological experiments
Preliminary and additional requirements	the pass of the Animal Physiology module 1
Contents of the training module – a compact description	Lectures: Myocardial electrophysiology, functional features of the myocardium, mechanics of myocardial contraction, contractility and force of myocardial contraction. Circulatory hemodynamics, blood flow through various vascular regions. Nervous and hormonal regulation of the circulatory system (heart, blood vessels), the phenomenon of autoregulation, cardiovascular reflexes. The mechanics of breathing. Mechanisms of gas exchange in lungs and tissues. Breathing regulation. The specificity of breathing in birds. Biological rhythms, the role of the pineal gland. Instincts, drives, motivational behavior - hypothalamic centers and limbic system, learning animals, sleep. Physiology of the excretory system - primary and final urine formation, regulation of water and mineral balance, regulation of acid-base balance. Autonomic and behavioral thermoregulatory mechanisms in ecto- and endothermic animals. Aestivation, hibernation, hypothermia, hyperthermia. The development and importance of fever. Regulatory mechanisms of metabolism and energy. Hormones, cytokines, growth factors - receptors, molecular mechanism of action. Hypothalamic-pituitary axis. Characteristics of the functions of peripheral endocrine glands and tissue hormones. Physiology of the reproductive system: genetic and hormonal sex determination, the role of the hypothalamic-pituitary-gonadal axis in sexual maturation, hormonal regulation of ovulation, hormonal basic of delivery. Lactation. Classes: Circulatory system physiology: Record of the mechanical activity of the heart, the influence of various factors on the functioning of the heart muscle (electrical stimulation, temperature, ions, irritation of the vagus). Assessment of the influence of various factors on vascular resistance and the amount of blood flow. Measurement and evaluation of blood pressure and pulse, auscultation and evaluation of heart sounds. Determination of the stroke volume and cardiac output from the measurements of the pulse and blood pressure. To assess the effect of weight and body position on the level of blood pressure and pulse rate. Assessment of cardiovascular capacity. Electrocardiography, determining the electrical axis of the heart. Respiratory physiology: Pneumography and thoracography. Vital capacity of the lungs and its components (spirometry test). Assessment of breathing resistance. Assessment of the influence of surfactant and changes in intrapulmonary pressure on respiration. Determination of O2 and CO2 content in blood.

	Determination of pulmonary ventilation at rest, during and after exercise. Thermoregulation: Types of heat exchange between the body and the environment. Influence of various environmental temperatures, mechanical irritation, evaporation of water, physical exertion on the temperature of the skin. Sensory physiology: comparing the sensitivity to tactile stimuli of the skin in different areas of the skin, examination of bone and air conduction, determination of the auditory threshold, examination of vestibulo-spinal and vestibulo-ocular reflexes, blind point test, positive and negative afterimage, subsequent and simultaneous contrast, evaluation of receptor distribution taste, the study of the relationship between the reception of taste and olfactory stimuli. Physiology of the reproductive system: examination of semen under a microscope, recognition of the phases of the sexual cycle based on changes in the epithelium of the vaginal mucosa, assessment of sex hormone changes depending on the phases of the sexual cycle, assessment of the motor activity of the rat uterus, the effect of oxytocin. Discussion of the role of gonadal hormones. Physiology of the excretory system: assessment of the physical properties of urine, determination of the influence of the diameter of the supply and outlet vessels and blood pressure on the renal filtration rate, the effect of hormones on urine formation, determination of urea in urine (method by Convey), discussion of clearance studies
Recommended literature:	1 Hill, Wyse, Anderson "ANIMAL PHYSIOLOGY” 2. Robin R. Preston, Thad E. Wilson Lippincott’s Illustrated Reviews: Physiology 3. Scientific papers
The intended forms/activities/ teaching methods	Lecture, multimedia presentations, films, virtual laboratory, laboratory analyses, examination of the parameters of the circulatory and respiratory systems, sensory organs, discussion, laboratory exercises report.
Methods of verification and documentation forms of the achieved learning outcomes	Knowledge: – ordinary test at the beginning of each laboratory class - lb 10 , partial test - lb 3 (neuromuscular physiology, digestive system, blood), discussion. The student have to obtain min. 30 points in ordinary tests (3-5 points) and min. 9 points in partial tests (3-5 points). The condition for passing the semester is to obtain 39 points - including the student have to pass 3 partial tests for min. 9 points Skills: – independent analysis and measurements of physiological parameters, assesment of the experiments by the teacher, preparing a report on the exercises. Social competence: – the participation in the discussion, answer to the verification questions during the classes and practical exercises, observation of the student's work in the laboratory by the teacher Documentation - archiving students' written works (all tests), book with all student grades, assessment in VDO, protocol

Balance of ECTS credits		Contact hours	ECTS
	lectures classes consultation retake tests exam	30 30 5 8 2	1,2 1,2 0,2 0,3 0,1
	The sum	75 godz.	3,0
		Non-contact hours	
	Preparation for exercises Reports study Self-preparation for successful test completion Reading literature Self-preparation for the exam	15 4 28 1 25	0.6 0,16 1.12 0.02 1
	The sum	73	2.9
	In total	150 h	6
Workload related to the activities requiring the direct participation of an academic teacher	lectures – 30 h – 1.2 ECTS points; classes – 30 h – 1.2 ECTS points; consultation 5 h – 0.2 ECTS points; retake tests 8 h- 0,3 ECTS points; exam 2 h – 0.1 ECTS points		
Relating modular learning outcomes to directional learning outcomes	K1 –AW2++, AW4++, AW5++, AW6+, AW7+++, AW8+++, AW9++, AW11++ K2- AW10++, AW11++ S1 - AU1+, AU4+, AU5+, AU7++ S2 – AU7++ Sc1 – K1++ Sc2 – K8++ Sc3 – K8++		
Impact of selected compounds to final grade	To pass the Animal Physiology 2 module, one have to obtain min. 42 points (12 points in partial test, 30 points in ordinary test). 70-64 - 5 58-63 – 4.5 52-57 - 4 48-51 – 3.5 43-47 – 3 . The final grade consists of the grade from the Physiology module I 10%, grade from the Physiology module II 10% and final exam grade 80%. The exam is a multiple-choice test. The exam grade is issued in accordance with the rules described in the Faculty Book of Education Quality.		