Module title:	Parasitology and Invasiology 2	**ECTS**	**3**
Polish translation:	Parazytologia I Inwaqzjologia (2)		
Course:	**Veterinary Medicine**		

Module language: English		Stage: JM-FVM	
Form of studies: ■ intramural ☐ extramural	Type of module: ☐ basic ■ directional ■ mandatory ☐ elective	Semester: …**5**…..	■ winter semester ☐ summer semester
Academic year:	**2023/2024**	Catalogue number:	**FVM-V-JMSS-05W-D55_23**

Module coordinator:	**Dr. Maciej Klockiewicz**
Teachers responsible for the module:	**Academic teachers of the Institute of Veterinary Medicine; Department of Pre-Clinical Sciences / Laboratory; PhD students in accordance to the internal legal acts; visiting professors; other specialists in the field of study**
Objectives of the module:	Characteristics of selected infections caused by parasitic nematodes and ectoparasites (insects and arachnids) as well as less often occurring ones (Acanthocephalans, Pentastomids) in farm, companion animals and humans. Introduction to clinical and molecular methods applied to detect and prevent drug resistance in parasites. Alternative parasite infection prevention methods. Molecular mechanisms of host-parasite relations. Parasite antigens, immune host-parasite reactions, evasion mechanisms of immune response, antiparasitic vaccines, allergies in parasitic infections. Topics of lectures: I-II. Parasitic arthropods – characteristics of infections caused by Insects, Arachnids and Crustaceans. Epidemiology and epizootiology of ectoparasite infections in domestic animals and humans. [2h] III-IV. Clinical consequences of insect infections in farm animals, horses and pet animals. Infestations caused by blood feeding Simulidae, Ctenocephalidae, Culicidae, etc. Epidemiology of Gasterophilus spp., *Hypoderma* spp., Oestrus sp.,. Zoonotic aspects of these infestations. [2h] V-VI. Diseases caused by Arachnids – introduction. Characteristics and epidemiology of Chorioptic, Psoroptic, Notoedric and Sarcoptic mange in farm and companion animals. Characteristics and epidemiology of *Cheylletiella* spp. and *Demodex* spp. infestations in farm and pet animals. Zoonotic aspects of these infections. [2h] VII-VIII. Occurrence, detection and preventive measures of parasite drug resistance in animals. Molecular mechanisms of resistance of anti-protozoan medicines, anthelmintics, insecticides and acaricides. Natural methods of parasite control in animals. [2h] IX-XV. Immunoparasitology and molecular parasitology. Host-parasite relationship. Antigens of parasites. Main protective mechanisms of the host. Parasite evasion mechanisms. Exploitation of vaccines in control of parasitic infection. New trends in control of parasitic infection.[7h] Topics of classes: - Clinical aspects, pathogenesis and control measures of large (Strongylidae) and small strongyles (Cyatostominae) in equids. Pathogenicity of Oesophagostomidae infections in cattle, small ruminants and pigs. [2h] - Nematodes penetrating trough the host skin – clinical aspects, diagnostics, and control of hookworm (Ancylostomatidae) and threadworm (Strongyloididae) infections in farm and pet animals. Hookworms – zoonotic aspects of the infection. [2h] - Nematodes of Trichostrogylidae family – parasitizing in ruminants. Pathogenesis and clinical pattern of infections caused by *Ostertagia* spp., *Haemonchus* sp., *Cooperia* sp., *Nematodirus* sp., *Teladorsagia* sp.. Specificity of *T. axei* infection in horses. Diagnostics and control of gastro-intestinal nematodes. [2h] - Infections cause by roundworms in farm and companion animals (*Ascaris suum/lubmricoides*, *Parascaris equorum*, *Toxocara* (*Neoascaris*) *vitulorum*, *Toxocara* spp., *Toxascaris leonina*, *Ascaridia galli*.) Pinworms – characteristics of the infection in horses (*Oyuris equi*), birds (*Heterakis gallinarum*). Epidemiology, clinical pattern, pathogenesis, diagnostics and control of roundworms and pinworms in animals. Zoonotics aspects of *toxocarosis* – prevention. [2h] - Nematodes parasitizing in respiratory tract in birds (*Syngamus trachea*) and mammals (*Dictyocaulus* spp., and of Metastrongylidae & Protostrongylidae families). Infection caused by whipworms (Trichuridae). *Capillaria* infections in pets (e.g. *C. plica*) – urine bladder infection in canids. Clinical pattern, pathogenesis, diagnostics and control of these infections. Zoonotic aspects of whipworm infections. [2h] - Infections caused by nematodes parasitizing in muscles, connective tissue and body cavities. Clinical diagnostics, pathogenesis and control of subcutaneous (skin) worm (*D. repens*) and heart (*D. immitis*) / dirofilariosis. *Trichinosis* and *dirofilariosis* – zoonotic aspects in these infections. Clinical pattern of *Angiostrongylus vasorum* infection in dogs. Infections caused by parasites of genera *Onchocerca*, *Thelazia*, *Setaria*, *Drachia* and *Habronema*. Pathogenesis, diagnostics and control of these infections. [2h] - Diagnostics of nematode infection in animals – laboratory diagnostics – practical training. [2h] - Infestations caused by parasitizing insects – fleas (*Ctenocephalides* spp., *Ceratophyllus* sp.), blood-sucking lice (*Linognathus setosus*, *Haematopinus suis*, etc.), chewing lice (*Menopon gallinae*, *Lipeurus sp*., *Columbicola sp*., *Bovicola sp*. *Trichodectes sp*., *Felicola sp*., *Werneckiella sp*., etc.). Fleas and lies as vectors of parasitic diseases. Zoonotic aspects of these infections. [2h] - Clinical pattern, pathogenesis, diagnostics and control of: *Gasterophilus* spp. and *Oestrus sp*. infections in equids; *Hypoderma* spp. in cattle, and *Oestrus ovis* u małych przeżuwaczy. Zoonotic aspects of these infections. [2h] - Infestations by parasitic insect cont. – blackflies (Simulium sp.) in cattle, horses and companion animals. Sheep ked infection (by *Melophagus ovinus*). *Myaisis* in animals. Characteristic of bad bag infection (by *Cimex lectularius*). Clinical symptoms, diagnostics, control measures.[2h]

		- Diseases caused by parasitic mites in farm and companion animals – mange. Infections of *S. scabiei*, *Chorioptes sp.*, *Psoroptes sp.*, *Notoedres sp.* Epidemiology and pathogenesis of O. cynotis infection in carnivorans. Mange of poultry – *Cnemidocoptes mutans*. Characteristics, diagnostics and control of these infections in animals. Zoonotic aspects of mange. [2h] - Demodex mite (*Demodex* spp.) infestations in cattle, dogs, goats and cats. Specificity of *Dermanyssus* and other mite infections. [2h] - Characteristics, pathogenesis and importance of tick infections (Ixodes sp., Dermacentor sp. Rhipicephalus sp.) for animal and human health.[2h] - Miscellanea – infection of Acanthocephalans, Pentastomidae – tongue worm, M. hirudinaceus and other *atypical* parasites. - Diagnostics of ectoparasite infections in animals – laboratory diagnostics – practical training. [2h]		
Teaching forms, number of hours:		a) Lectures; hours: **15**; b) Laboratory classes; hours: **30**; c) Seminars; hours …; d) Clinical laboratories; hours …; e) Field exercises; hours …;		
Teaching methods:		1/ Original multimedia presentations prepared by academic teachers; 2/ Presentation of diagnostics methods by teachers, student's own work in parasitological laboratory, investigation of macroscopic and microscopic preparations of parasites slides, testing of biological material (feces, blood, skin scrapings, etc.) for the detection of parasites. 3/ Discussion on rules concerning diagnostics and parasite control methods in farm and companion animals, incl. these of zoonotic potency. 4/ Consultations at the student's request. 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:		Passing the courses of: animal anatomy, animal physiology, veterinary microbiology		
Learning effects		Course outcomes:	Learning outcomes relative to the course outcomes	Impact on the course outcomes*
Knowledge:	1	Student knows characteristics of parasite species, their life cycles and hosts	A.W.13	3
			A.W.20	2
			A.W.1, A.W.2, A.W.4	1
	2	Student knows the consequences of parasite infections (incl. zoonotic potency infections) in animals and humans	A.W.13, B.W.10	3
			A.W.11, A.W.12	2
			A.W.10, B.W.1, B.W.2, B.W.3, B.W.4, B.W.8, B.W.9	1
	3	Student knows antiparasitic compounds (drugs) and rules concerning their use in the control of parasite infection in animals	A.W.17, A.W.18	3
			A.W.16, B.U.13	2
			A.W.21	1
Skills:	1	Student is able to recognise clinical symptoms of parasitic infections	A.U.4.	3
			B.U.2, B.U.3	2
			B.U.3, B.U.5, B.U.16	1
	2	Student is able to recognise pathological lesions caused by parasite in affected host	B.W.10	3
			A.U.13	2
			B.U.25	1
	3	Student is able to choose the adequate diagnostic method(s) to detect parasitic infection	B.U.6, B.U.13	3
			A.U.12, A.U.13, B.U.2	2
			A.U.21, A.U.23, B.U.16, B.U.22	1
Competences:	1	Student is ready to use knowledge to set up the optimal control method parasitic infections	KS.4	3
			KS.7, KS.8, KS.9	2
			KS.5	1
	2	Student is able to communicate with owner using proper language and terms to discuss infection's issues	KS.1, KS.9	3
			KS.7, KS.11	2
			KS.2	1
Objectives of the module required to obtain learning effects:		Knowledge concerning selected infections caused by parasitic nematodes and ectoparasites (insects and arachnids) as well as less often occurring ones (acanthocephalans, pentastomids) in farm, companion animals and humans. Introduction to clinical and molecular methods applied to detect and prevent drug resistance in parasites. Alternative parasite infection prevention methods. Molecular mechanisms of host-parasite relations. Parasite antigens, immune host-parasite reactions, evasion mechanisms of immune response, antiparasitic vaccines, allergies in parasitic infections.		
Assessment methods:		To complete the semester student is obliged to pass 2 colloquiums (oral examination). There are 5 question given by teacher, incl. 1 considering zoonotic/anthropozoonotic infections. Condition - colloquium is passed when more than 51% achieved, with general objection that answer for the question concerning zoonotic infection must be assessed positively. Scope of knowledge: C3- infections caused by nematodes;C4 - infections caused by ectoparasites. Passing of both colloquiums is conducted by the same way.		

	The final exam – it can be done by student who successfully passed all 4 colloquiums (C1-4). The exam is conducted orally. Student chooses 4 questions: 1 from mandatory set concerning molecular parasitology, immunoparasitology and parasite drug resistance; and 3 questions concerning veterinary parasitology. Passing is achieved when student gets minimum 51% for each of the questions. Passing of both terms of the exam is conducted by the same way. 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:	… No extra assessment methods are anticipated. The eHMS entry. 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.
Elements impelling final grade:	To obtain the semester credit student has to pass both colloquiums (C3 & C4), fulfilling condition of attendance according to the WULS-SGGW Regimen. The final /eHMS/ grade consist of 80% the final exam and 20% of C1-4 grades, respectively (arithmetic mean).
Teaching base:	Lecture hall at the Faculty of Veterinary Medicine, laboratories in the Department of Preclinical Sciences
Mandatory and supportive materials : 1. Taylor M.A., Coop R.L., Wall R.L. Veterinary Parasitology, Blackwell Publishing, 2007. 2. Bowman D.D. Parasitology for Veterinarians. WB Sanders 2000. 3. Kassai T. Veterinary Helminthology. Butterworth-Heinemann, 1999 4. Urquhart G.M. et al. Veterinary Parasitology, Longman Group UK 1987. 5. Georgi J.R., Georgi M.E. Canine clinical parasitology, Lea & Febiger 1992. 6. Relevant scientific publications, including those of the module coordinator. Relevant scientific publications including those of the module coordinator.	
ANNOTATIONS Students are obliged to respect health and safety rules. Students use protective gears during laboratory classes.	

* 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:	**100…. h**
Total ECTS points, accumulated by students during contact learning:	**…2…. ECTS**