Syllabu

Module title:	Honeybee diseases	ECTS	2
Polish translation:	Choroby owadów użytkowych		
Course:	**Veterinary Medicine**		

Module language: English			Stage: JM-FVM	
Form of studies: ■ intramural ☐ extramural	Type of module: ☐ basic ☐ directional	☐ mandatory ☐ elective	Semester: …….	☐ winter semester ☐ summer semester
Academic year:	**2022/2023**	Catalogue number:	**……**	

Module coordinator:	**Dr hab. n. wet. Anna Gajda**
Teachers responsible for the module:	**Academic teachers of the Institute of Veterinary Medicine; Department of Pathology and Veterinary Diagnostics; PhD students in accordance to the internal legal acts; visiting professors; other specialists in the field of study**
Objectives of the module:	The objective of the course is to prepare students to perform basic tasks concerning honeybee health issues, which every veterinarian may come in contact with. It should also familiarize students with the basic health issues concerning silkworm and bumblebee rearing and solitary bees rearing. The aim of the course is to prepare the students to: perform apiary inspection; recognize symptoms that may indicate the presence of adult bee and brood diseases, poisoning, occurrence of pests in the apiary; proceed appropriately when in suspicion of specific bee diseases or bee poisoning exists; collect samples for the purpose of diagnosis of bee diseases and bee poisoning; diagnose and control American foulbrood and varroosis; recognize the symptoms of diseases in silkworms, bumblebees and solitary bees; proceed appropriately when bumblebee, silkworm or solitary bees diseases are suspected . LECTURE TOPICS: 1. Overview of honeybee biology [2h] 2. Outline information on beekeeping practices [2h] 3. Symptoms of varroosis, SHB infestation, detailed information on Varroa control and basic information on the legislations on honeybee diseases [4h] LABORATORY/APIARY CLASSES: 1. Basics of anatomy, physiology and biology of bees 2. Beekeeping practices that might influence the spread and development of bee diseases. Apiary examination and sample collection 3. Pathogenesis and symptoms of basic bee diseases (varoosis, nosemosis, viral infection, *Tropilaelaps spp.* and *Braula coeca* invasions) 4. Pathogenesis and symptoms of small hive beetle invasion and waxmoth invasion 5. Pathogenesis and symptoms of basic brood diseases (american and European foulbroods, Chalkbrood, stonebrood, sacbrood, chilled brood), symptoms of *Bettsia alvei* hive infestation 6. Pathogenesis and symptoms of other bee diseases (acarapisosis, chronic bee paralysis, poisonings) and mass bee losses 7. Diagnostic methods used in connection to varoosis 8. Controlling varroosis and American foulbrood The content of the lectures supplements the content of the laboratory classes.
Teaching forms, number of hours:	a) Lectures; hours 8 b) Laboratory classes; hours 14 c) Clinical laboratories (in the apiary); hours 8
Teaching methods:	• Multimedia presentations prepared by academic teachers • Authorial e-learning • Thematic videos Methods aimed at teaching practical skills: • Laboratory classes with student's own work with bee dissection • Examination of microscopic and biological specimens, • Laboratory examinations of field samples • Apiary classes with honeybee colonies, where students use basic beekeeping equipment and specialized sampling equipment • Consultations (1h/week). 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: Biology, Microbiology, Veterinary Epidemiology

Learning effects	Course outcomes:	Learning outcomes relative to the course outcomes	Impact on the course outcomes*

Knowledge:	1	- Student knows and describes external and internal anatomy of the honeybee and the function of respective elements	A.W.1, A.W.2,A.W.3, A.W.4	3
	2	- Student describes constitution of honeybee colony and its basic physiology of honeybee colony	A.W.2,A.W.3, A.W.4	3
		- Student knows basic parts of beekeeping equipment and describes basic activities in bee management during the year.	B.W.9, B.W.11, B.W.13,	2
		- Student knows the symptoms which may indicate the presence of basic adult bee and brood diseases and pests in the apiary	B.W.1, B.W.2, B.W.3, B.W.4, B.W.5, B.W.10	3
		- Student knows the symptoms which may indicate the presence of basic adult bee and brood diseases and pests in the apiary.	B.W.5, B.W.8, B.W.9,	3
		- Student knows Polish and Latin medical nomenclature	A.W.20	2
Skills:	1	- Student performs veterinary inspection of the apiary and knows the rules of sampling biological material for laboratory analyses	B.U.1, B.U.2, B.U.3, B.U.5, B.U.6, B.U.7	2
	2	- Student can recognize the symptoms which may indicate the presence of basic adult bee and brood diseases and pests in the apiary	B.U.19	3
		- Student implements proper procedures in case of bee diseases or poisoning	B.U.5, B.U.8, B.U.10, B.U.19, B.U.21	3
		- Student implements proper procedures in control of American foulbrood and varoosis	B.U.8, B.U.10, B.U.13,B.U.15, B.U.19 , B.U.21	3
		- Student recognises the symptoms of silkworm, solitary bee and bumblebee diseases, implements proper procedures of their control	B.U.21, B.U.19, B.U.13, B.U.10, B.U.6, B.U.5, B.U.1, B.U.2, B.U.3	3
Competences:	1	- Student understands the role of honeybees in agriculture and environment as well as threats to which honeybee colonies are exposed	K.S.1, K.S.2, K.S.5, K.S.4	2
	2			

Objectives of the module required to obtain learning effects:	The objective of the course is to prepare students to perform basic tasks concerning honeybee health issues, which every veterinarian may come in contact with. It should also familiarize students with the basic health issues concerning silkworm and bumblebee rearing and solitary bees rearing. The aim of the course is to prepare the students to: perform apiary inspection; recognize symptoms that may indicate the presence of adult bee and brood diseases, poisoning, occurrence of pests in the apiary; proceed appropriately when in suspicion of specific bee diseases or bee poisoning exists; collect samples for the purpose of diagnosis of bee diseases and bee poisoning; diagnose and control American foulbrood and varroosis; recognize the symptoms of diseases in silkworms, bumblebees and solitary bees; proceed appropriately when bumblebee, silkworm or solitary bees diseases are suspected
Assessment methods:	1. short tests on the Moodle platform on a chosen day before classes week for all groups. The scope of the material will be specified by the coordinator at the beginning of the semester. Tests verifying students' preparation for classes can be taken only before the proper class and cannot be re-taken. For each test the student can score maximum 4 points (4 single answer test questions, 1 point per question). 2. Assessment of tasks given during classes (max. 1 point for each class). Making up for missed classes is possible at the end of the semester only after justification with sick leave documents or other documents stating the reason. Presence during classes about varoosis and American foulbrood is mandatory. 3. Final test checking the knowledge gathered during classes, lecture and from materials given by the coordinator. The test is a single-choice test on Moodle platform: 40 questions (1 point each = maximum 40 points) Term II: : for students which did not take the first term or did not score the required number of 48 points (short tests, tasks, final test). Terms I i II have the same form. No extra assessment methods are anticipated. 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:	eHMS entry. Records collected in the course portfolio (general rules of the course, individual records of student results, presence lists, database of oral and written questions).
Elements impelling final grade:	Attendance to the classes is mandatory, student can be absent on 20% of classes or according to the current academic regulations. The final grade entered in e-HMS = the sum of all points from classes (40) and the final test (40) according to the scale:

Sum of points scored	Final grade
0 – 47,5	2
48 – 54,5	3
55-61,5	3,5
62-68,5	4

	69-75,5 | 4,5 76-80 | 5
Teaching base:	Institute of Veterinary Medicine - lecture hall, laboratory, experimental apiary

Mandatory and supportive materials :

1. Dade, H A (2009) *Anatomy and Dissection of the Honeybee*. IBRA, Cardiff
2. Cramp, D (2008) *A Practical Manual of BEEKEEPING*, Spring Hill, Oxford. http://library.uniteddiversity.coop/Beekeeping/A_Practical_Manual_of_Beekeeping.pdf
3. Mary F. Coffey (2007) *Parasites of the Honeybee*, Teagasc, Crops Research Centre, Oak Park, Carlow https://www.agriculture.gov.ie/media/migration/farmingsectors/beekeepingandhoney/HoneybeePublication.pdf.
4. Ritter W. (2006) *Honey bee diseases and pests: a practical guide* AGRICULTURAL AND FOOD ENGINEERING TECHNICAL REPORTS ftp://ftp.fao.org/docrep/fao/012/a0849e/a0849e00.pdf
5. Nosemosis of honey bees. (OIE Terrestrial Manual (2013). Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018. http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.04_NOSEMOSIS_FINAL.pdf
6. Varroosis of honey bees (OIE Terrestrial Manual (2008)). Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018. http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.07_VARROOSIS.pdf.
7. Acarapisosis of honey bees (OIE Terrestrial Manual (2008)). Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018. http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.01_ACARAPISOSIS.pdf
8. American foulbrood of honey bees (OIE Terrestrial Manual (2016)). Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018. http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.02_AMERICAN_FOULBROOD.pdf
9. European foulbrood of honey bees (OIE Terrestrial Manual (2016)). Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018. http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.03_EUROPEAN_FOULBROOD.pdf
10. Tropilaelaps infestation of honey bees (OIE Terrestrial Manual (2018)) Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018. http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.06_TROPILAELAPS.pdf
11. Small hive beetle infestation (OIE Terrestrial Manual (2018). Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018. http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.05_SMALL_HIVE_BEETLE.pdf
12. Topolska G., Gajda A, Imińska U. (2018) Atlas chorób pszczół najbardziej istotnych dla polskich pszczelarzy. PWRiL, Warszawa 2018 r..
13. E-learning materials provided on the Moodle platform

Relevant scientific publications, including those of the module coordinator.

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:	**45 h**
Total ECTS points, accumulated by students during contact learning:	**1. ECTS**