

UNIVERSITY OF ZAGREB
FACULTY OF VETERINARY MEDICINE
Heinzelova 55
Tel. 01/2390-153
Division: ANIMAL PRODUCTION AND BIOTECHNOLOGY
Organizational unit: BIOLOGY AND PATHOLOGY OF FISH AND BEES
E-mail of the course leader: itlak@vef.unizg.hr
Register No of the organisational unit:
Zagreb, 27/02/2023



159828	REPUBLIKA HRVATSKA		
Veterinarski fakultet u Zagrebu			
Primljeno:	10.02.2023		
Klasifikacijska oznaka	Org. jed.		
605-03/22-04/35	251-61-32;		
Uredbeni broj	Prilozi	Vrijednost	
251-61-14/359-23-70	0	-	

COURSE SYLLABUS

Course name: BIOLOGY AND PATHOLOGY OF BENEFICIAL INSECTS

Academic year 2022/2023

Course leader: Full Professor Ivana Tlak Gajger

Deputy course leader: Assistant Professor Krešimir Matanović

Teachers: Full Professor Ivana Tlak Gajger
Assistant Professor Krešimir Matanović
Valerija Benko PhD

First day of classes: 27/2/2023

Last day of classes: 22/5/2023

Timetable for LECTURES academic year 2022/2023

LECTURES				
Date	Methodological unit	Teacher	Location / Time	Literature
27/2/2023 1 st lecture	Introduction. Species and races of honeybees. Honeybee colony. Development of honeybee brood. Apian products.	Full Professor Ivana Tlak Gajger	Practice Room Biology and Pathology of Fish and Bees 12pm-2pm	No. 1, 3, 4, 6, 7 student notes
28/2/2023 2 nd lecture	Life and development of honeybee colony.	Full Professor Ivana Tlak Gajger	Practice Room Biology and Pathology of Fish and Bees 2pm-4pm	No. 1, 3, 4, 6, 7 student notes
13/3/2023 3 rd lecture	Role of veterinarians in beekeeping. Recognizing of diseases signs. Legislation. Bacterial diseases. American foulbrood.	Full Professor Ivana Tlak Gajger	Practice Room Biology and Pathology of Fish and Bees 2pm-4pm	No. 1 student notes
14/3/2023 4 th lecture	European foulbrood. Virus diseases. Nosemosis.	Full Professor Ivana Tlak Gajger	Practice Room Biology and Pathology of Fish and Bees 2pm-4pm	No. 1
17/3/2023 5 th lecture	Parasitic diseases (Varroosis, Acarosis); Fungal diseases (Chalkbrood disease, Stonebrood disease).	Assistant Professor Krešimir Matanović	Practice Room Biology and Pathology of Fish and Bees 2pm-4pm	No. 1
24/3/2023 6 th lecture	Non-infection diseases. Toxicology in beekeeping. Pests (Aethina tumida).	Full Professor Ivana Tlak Gajger	Practice Room Biology and Pathology of Fish and Bees 4.15pm-5.15pm	No. 1, 5

Timetable for PRACTICALS academic year 2022/2023

PRACTICALS						
Date	Methodological unit	Teacher	Type of practical (Article 31. of Regulation)	Group	Location / time	Literature
1/3/2023 1 st practical	Hives. Beekeeping equipment. Beeswax combs and comb foundations.	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović	Laboratory	1, 2	Practice Room Biology and Pathology of Fish and Bees 8am-10am	No. 7, 2 student notes
1/3/2023 2 nd practical	Anatomy of honeybee I (Exoskelet, legs, wings; organs for feeding).	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović	Laboratory	1, 2	Practice Room Biology and Pathology of Fish and Bees 10am-12am	No. 2
3/3/2023 3 rd practical	Anatomy of honeybee II (Alimentary channel, respiratory system, circulatory system, nervous and sensory system).	Full Professor Ivana Tlak Gajger Valerija Benko PhD	Laboratory	1, 2	Practice Room Biology and Pathology of Fish and Bees 12pm-2pm	No. 2
8/3/2023 4 th practical	Anatomy of honeybee III (Eye, wax glands, scent glands, sting and poisoning gland).	Full Professor Ivana Tlak Gajger Valerija Benko PhD	Laboratory	1, 2	Practice Room Biology and Pathology of Fish and Bees 2pm-4pm	No. 2
9/3/2023 5 th practical	Diagnostic, control and eradication of honeybee diseases I.	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović	Clinical	1	Practice Room Biology and Pathology of Fish and Bees 2pm-4pm	No. 1, 5 student notes
10/3/2023 5 th practical	Diagnostic, control and eradication of honeybee diseases I.	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović	Clinical	2	Practice Room Biology and Pathology of Fish and Bees 2pm-4pm	No. 1, 5 student notes
14/3/2023 6 th practical	Diagnostic, control and eradication of honeybee diseases	Full Professor Ivana Tlak Gajger Assistant Professor	Clinical	1	Practice Room Biology and Pathology of Fish and Bees	No. 1, 5 student notes

Course Biology and Pathology of Beneficial Insects

	II.	Krešimir Matanović			12pm-2pm	
15/3/2023 6 th practical	Diagnostic, control and eradication of honeybee diseases II.	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović	Clinical	2	Practice Room Biology and Pathology of Fish and Bees 2pm-4pm	No. 1, 5 student notes
20/3/2023 7 th practical	Morphological identification of exotic parasites and pests (<i>Aethina tumida</i> ; <i>Tropilaelaps</i> spp.).	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović	Clinical	2	Practice Room Biology and Pathology of Fish and Bees 8am-10am	No. 1, 5
21/3/2023 7 th practical	Morphological identification of exotic parasites and pests (<i>Aethina tumida</i> ; <i>Tropilaelaps</i> spp.).	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović	Clinical	1	Practice Room Biology and Pathology of Fish and Bees 8am-10am	No. 1, 5
27/3/2023 8 th practical	Biology and pathology of bumblebees and solitary bees – <i>Osmia</i> spp.	Assistant Professor Krešimir Matanović Valerija Benko PhD	Clinical	1	Practice Room Biology and Pathology of Fish and Bees 8am-10am	student notes
28/3/2023 8 th practical	Biology and pathology of bumblebees and solitary bees – <i>Osmia</i> spp.	Assistant Professor Krešimir Matanović Valerija Benko PhD	Clinical	2	Practice Room Biology and Pathology of Fish and Bees 8am-10am	student notes
5/4/2023	COLLOQUIUM			1, 2	Lecture Room Pharmacology 2.30pm-3.30pm	
16/5/2023 9 th practical	Clinical examination of honeybee colony I.	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović Valerija Benko PhD	Special clinical	1, 2	Apiary I 7am-6pm	No. 1
22/5/2023 12 th practical	Clinical examination of honeybee colony II.	Full Professor Ivana Tlak Gajger Assistant Professor Krešimir Matanović Valerija Benko PhD	Special clinical	1, 2	Apiary II 7am-6pm	No. 1

STUDENT OBLIGATIONS

Lecture attendance	Attending lectures: 3-6 points (1 lecture hour equals 0.54 point)
Practicals attendance	Attending practicals: 9,6-12 points. Student must attend at least 20 hours of practicals to achieve minimum of 9,6 points.
Active participation in seminars and practicals	Participation at exercises: 5-10 points (evaluated with short oral tests)
Final exam	Final exam – oral: 24-40 points (5 questions): 1 question equals 8 points
Examination requirements	Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine (2022). Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. Article 41: a student can justifiably be absent from up to 50 % of the lectures; 20% of the seminars and 20 % of the exercises.

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GRADING AND EVALUATING STUDENT WORK

Continuous knowledge-checking (mid-terms)	Continuous knowledge checking (1 preliminary exam – 20 questions): 20-32 points (1 question equals 1.6 points)
Final exams (dates)	14/6/2023, 03/07/2023, 14/07/2023, 30/8/2023 and 20/09/2023
Form of final exam	Oral

GRADING SCHEME

<i>Points</i>	<i>Grade</i>
Up to 59	1 (F)
60-76	2 (D,E)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

Course leader

Plav.

Head of organizational unit:

Matonović

Note: The course leader is required to submit a Course Syllabus to all teachers and associates pertaining to the Course.

OBJECTIVES AND LEARNING OUTCOMES

Course objectives	During lectures and exercises student must obtain general knowledge about honeybee breeding in order to comprehend the importance and role of veterinarians in recognizing and controlling diseases. The skills which one must accomplish are proper examination of honeybee colonies, recognition of clinical signs, sampling and sending the materials for laboratory procedures, and also apply prevention and therapy of honeybee diseases.
Learning outcomes	<p>The course is linked to the basic veterinary courses in previous years of study, and represents synthesis of previous veterinary disciplines applicable to the biology and pathology of beneficial insects. The course prepares students for laboratory and field work in biology and pathology of beneficial insects array.</p> <p>Learning outcomes:</p> <ol style="list-style-type: none">1. Annotate the role of honeybee in natural ecosystems2. Explain manner of life and activities of honeybee colony, construction of combs and development of brood3. Recognize different types of hives, feeders and water suppliers, and beekeeping equipment4. Describe individual organs of health honeybee and alterations caused by diseases5. Distinguish diseases of brood and adult bees based on characteristic signs6. Apply basic clinical and diagnostic techniques with aim to appoint suspicion on honeybee diseases7. Define role of veterinarian in procedure of sampling and sending materials for laboratory examinations, treatments and sanitation of diseases.

LITERATURE

Obligatory literature	<ol style="list-style-type: none">1. VIDAL-NAQUET, N. (2015): Honeybee Veterinary Medicine: <i>Apis mellifera</i> L. 5m Publishing Benchmark House, Sheffield, UK.2. SNODGRASS, R. E., E. H. ERIKSON (2005): The anatomy of the honey bee. The hive and the honey bee (ed. J. M. Graham). Dadant and Sons, Hamilton, USA.3. SOUTHWICK, E. E. (2005): Physiology and social physiology of the honey bee. The hive and the honey bee (ed. J. M. Graham). Dadant and Sons, Hamilton, USA.4. GARY, N. E. (2005): Activities and behavior of honey bees. The hive and the honey bee (ed. J. M. Graham). Dadant and Sons, Hamilton, USA.5. BAILEY, L., B. BALL (1991): Honey bee pathology. Academic Press, London.
Optional literature	<ol style="list-style-type: none">6. TAUTZ, J. (2008): The buzz about bees – biology of a superorganism. Springer, Germany.7. CARON, D. M., L.J. CONNOR (2013): Honey bee biology and beekeeping. Wicwas Press, Pennsylvania, USA.