



SZKOŁA GŁÓWNA  
GOSPODARSTWA  
WIEJSKIEGO

## Bee diseases

### Educational subject description sheet

#### Basic information

<b>Field of study</b> Veterinary Medicine	<b>Didactic cycle</b> 2024/25
<b>Speciality</b> -	<b>Subject code</b> WETFVMS_D.520.01705.24
<b>Organizational unit</b> Faculty of Veterinary Medicine	<b>Lecture languages</b> english
<b>Study level</b> long-cycle	<b>Mandatory</b> Obligatory subjects
<b>Study form</b> full-time studies	<b>Block</b> Major subjects
<b>Education profile</b> General academic	<b>Disciplines</b> Veterinary medicine
<b>Coordinator</b>	Anna Gajda
<b>Teacher</b>	Anna Gajda, Ewa Mazur
<b>Period</b> Semester 6	<b>Examination</b> Pass with grade
	<b>Activities and hours</b> Lecture: 15 Laboratory exercises: 8 Field exercises: 7
	<b>Number of ECTS points</b> 2

## Goals

Code	Goal
C1	The aim of the course is to prepare the students to perform apiary inspection
C2	The aim of the course is to prepare the students to recognize symptoms that may indicate the presence of adult bee and brood diseases, poisoning, occurrence of pests in the apiary
C3	The aim of the course is to prepare the students to proceed appropriately when in suspicion of specific bee diseases or bee poisoning exists
C4	The aim of the course is to prepare the students to collect samples for the purpose of diagnosis of bee diseases and bee poisoning
C5	The aim of the course is to prepare the students to diagnose and control American foulbrood and varroosis
C6	The aim of the course is to prepare the students to recognize the symptoms of diseases in bumblebees and solitary bees
C7	The aim of the course is to prepare the students to proceed appropriately when bumblebee or solitary bees diseases are suspected

## Entry requirements

Biology, Veterinary microbiology 2, Veterinary virology, Veterinary epidemiology, Parasitology and invasiology 2, Veterinary pharmacology 1

## Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
<b>Knowledge - Student knows and understands:</b>			
W1	external and internal anatomy of the honeybee and the function of respective elements	B.W1, B.W11	Test (written or computer based), Assessment of activity during classes
W2	constitution of honeybee colony and its basic physiology of honeybee colony	B.W11, B.W12	Test (written or computer based), Assessment of activity during classes
W3	basic parts of beekeeping equipment and describes basic activities in bee management during the year	B.W11, B.W12, B.W9	Test (written or computer based), Assessment of activity during classes
W4	the symptoms which may indicate the presence of basic adult bee and brood diseases and pests in the apiary	B.W1, B.W10, B.W2, B.W3	Test (written or computer based), Assessment of activity during classes
<b>Skills - Student can:</b>			
U1	sample biological material for laboratory analyses	B.U1, B.U2, B.U3, B.U5, B.U6	Test (written or computer based), Assessment of activity during classes
U2	recognize the symptoms which may indicate the presence of basic adult bee and brood diseases and pests in the apiary	B.U1, B.U2, B.U3, B.U5	Test (written or computer based), Assessment of activity during classes
U3	implement proper procedures in case of bee diseases or poisoning	B.U1, B.U10, B.U11, B.U13, B.U15, B.U2, B.U8, B.U9	Test (written or computer based), Assessment of activity during classes

<b>Code</b>	<b>Outcomes in terms of</b>	<b>Effects</b>	<b>Examination methods</b>
U4	implement proper procedures in control of American foulbrood and varroosis	B.U1, B.U10, B.U13, B.U15, B.U2, B.U5, B.U8, B.U9	Test (written or computer based), Assessment of activity during classes
U5	recognises the symptoms of solitary bee and bumblebee diseases, implements proper procedures of their control	B.U10, B.U13, B.U5	Test (written or computer based), Assessment of activity during classes
<b>Social competences - Student is ready to:</b>			
K1	understand the role of honeybees in agriculture and environment as well as threats to which honeybee colonies are exposed	KS.1, KS.2, KS.3, KS.4, KS.5	Test (written or computer based), Assessment of activity during classes

## Study content

<b>No.</b>	<b>Course content</b>	<b>Subject's learning outcomes</b>	<b>Activities</b>
1.	Overview of honeybee biology	W1, W2, K1	Lecture
2.	Outline information on beekeeping practices	W3	Lecture
3.	Symptoms of varroosis, SHB infestation, detailed information on Varroa control and basic information on the legislations on honeybee diseases	W4, U2, U3, U4	Lecture
4.	Basics of anatomy, physiology and biology of bees	W1	Laboratory exercises
5.	Basics of anatomy, physiology and biology of bees	W2	Laboratory exercises
6.	Beekeeping practices that might influence the spread and development of bee diseases. Apiary examination and sample collection	W3, W4, U1, K1	Laboratory exercises, Field exercises
7.	Pathogenesis and symptoms of basic bee diseases (varroosis, nosemosis, viral infection, Tropilaelaps spp. and Braula coeca invasions)	W1, W4, U2	Laboratory exercises
8.	Pathogenesis and symptoms of small hive beetle invasion and waxmoth invasion	W4, U2	Laboratory exercises
9.	Pathogenesis and symptoms of basic brood diseases (american and European foulbroods, Chalkbrood, stonebrood, sacbrood, chilled brood), symptoms of Bettsia alvei hive infestation	W4, U1, U2, K1	Laboratory exercises
10.	Pathogenesis and symptoms of other bee diseases (acarapisosis, chronic bee paralysis, poisonings) and mass bee losses	W4, U1, U2, U3, K1	Laboratory exercises
11.	Diagnostic methods used in connection to varroosis	W3, W4, U1, U2	Laboratory exercises, Field exercises
12.	Controlling varroosis and American foulbrood	W4, U1, U2	Laboratory exercises, Field exercises
13.	Bumblebee and solitary bee diseases and their prevention and control	U5, K1	Lecture

## Course advanced

Activities	Methods of conducting classes
Lecture	Lecture, Conversation lecture, E-learning - lecture part, Discussion, Presentation
Laboratory exercises	Case study, Discussion, Teamwork, Individual work, Interpreting the results, Laboratory (experiment), learning by experiment, Observation, Display
Field exercises	Case study, Discussion, Brainstorm, Problem solving, Teamwork, Individual work, Interpreting the results, Field measurements, Field observations

Activities	Examination method	Percentage
Lecture	Test (written or computer based)	50%
Laboratory exercises	Test (written or computer based)	25%
Laboratory exercises	Assessment of activity during classes	6.25%
Field exercises	Test (written or computer based)	15%
Field exercises	Assessment of activity during classes	3.75%

Activities	Credit conditions
Lecture	<p>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).</p> <p>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.</p> <p>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)</p> <p>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.</p> <p>No extra assessment methods are anticipated. In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted.</p>
Laboratory exercises	<p>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).</p> <p>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.</p> <p>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)</p> <p>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.</p> <p>No extra assessment methods are anticipated. In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted.</p>

Activities	Credit conditions
Field exercises	<p>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).</p> <p>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 varroosis and American foulbrood is mandatory.</p> <p>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)</p> <p>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.</p> <p>No extra assessment methods are anticipated. In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted.</p>

## Literature

### Obligatory

- Dade, H A (2009) Anatomy and Dissection of the Honeybee. IBRA, Cardiff
- Cramp, D (2008) A Practical Manual of BEEKEEPING, Spring Hill, Oxford.
- Cramp, D (2008) A Practical Manual of BEEKEEPING, Spring Hill, Oxford.  
[http://library.uniteddiversity.coop/Beekeeping/A\\_Practical\\_Manual\\_of\\_Beekeeping.pdf](http://library.uniteddiversity.coop/Beekeeping/A_Practical_Manual_of_Beekeeping.pdf)
- 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>.
- 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>

### Optional

- 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](http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.04_NOSEMOSIS_FINAL.pdf)
- 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](http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.07_VARROOSIS.pdf).
- 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](http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.01_ACARAPISOSIS.pdf)
- 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](http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.02_AMERICAN_FOULBROOD.pdf)
- European foulbrood of honey bees ( OIE Terrestrial Manual (2016)). Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2018.
- 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\\_TROPILAEALAPS.pdf](http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.06_TROPILAEALAPS.pdf)
- 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](http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.02.05_SMALL_HIVE_BEETLE.pdf)

## Calculation of ECTS points

Activity form	Activity hours*
Lecture	15

Laboratory exercises	8
Field exercises	7
Preparation for the exam	20
<b>Student workload</b>	<b>Hours</b> 50
<b>Number of ECTS points</b>	<b>ECTS</b> 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
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.U5	Absolwent potrafi oceniać stan odżywienia zwierzęcia oraz udzielać porad w tym zakresie
B.U6	Absolwent potrafi pobierać i zabezpieczać próbki do badań oraz wykonywać standardowe testy laboratoryjne, a także prawidłowo analizować i interpretować wyniki badań laboratoryjnych
B.U8	Absolwent potrafi wdrażać właściwe procedury w przypadku stwierdzenia choroby podlegającej obowiązkowi zwalczania lub rejestracji
B.U9	Absolwent potrafi pozyskiwać i wykorzystywać informacje o weterynaryjnych produktach leczniczych dopuszczonych do obrotu
B.U10	Absolwent potrafi przepisywać i stosować weterynaryjne produkty lecznicze oraz materiały medyczne, z uwzględnieniem ich bezpiecznego przechowywania i utylizacji
B.U11	Absolwent potrafi stosować metody bezpiecznej sedacji, ogólnego i miejscowego znieczulenia oraz oceny i łagodzenia bólu
B.U13	Absolwent potrafi dobierać i stosować właściwe leczenie
B.U15	Absolwent potrafi ocenić konieczność przeprowadzenia eutanazji zwierzęcia i we właściwy sposób poinformować o tym jego właściciela, a także przeprowadzić eutanazję zwierzęcia zgodnie z zasadami etyki zawodowej oraz właściwego postępowania ze zwłokami
B.W1	Absolwent zna i rozumie zaburzenia na poziomie komórek, tkanki, narządu, układu i organizmu w przebiegu choroby
B.W2	Absolwent zna i rozumie mechanizmy patologii narządowych i ustrojowych
B.W3	Absolwent zna i rozumie przyczyny i objawy zmian anatomopatologicznych, zasady leczenia i zapobiegania w poszczególnych jednostkach chorobowych
B.W9	Absolwent zna i rozumie zasady zapewniania dobrostanu zwierząt
B.W10	Absolwent zna i rozumie zasadę funkcjonowania układu pasożyt-żywiciel i podstawowe objawy chorobowe i zmiany anatomopatologiczne wywołane przez pasożyty w organizmie gospodarza
B.W11	Absolwent zna i rozumie rasy w obrębie gatunków zwierząt oraz zasady chowu i hodowli zwierząt
B.W12	Absolwent zna i rozumie założenia doboru zwierząt do kojarzeń, metody zapładniania i biotechnologii rozrodu oraz selekcji hodowlanej