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| **Title and Code** of the subject: **Beekeeping, MTMAL7019A** | **ECTS Credit Points: 3** |
| **Type** of the subject: compulsory / optional |
| **Ratio of theory and practice: 60/40** (credit%) |
| **Type and number of classes per semester**: the lessons are in blocks, 4 times/semester)Number of teaching hours / week : 1+2 (lecture and practice)  |
| **Type of exam**: exam / practical course mark |
| **Subject in the curriculum**: IV. semester |
| **Preliminary requirements:-**  |

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| **Summary of content - theory**:  |
| Course objectives:….1. The importance of pillinisation by honeybees (ecological services)
2. The biology of *Apis mellifera*, the social behaviour of european honeybees
3. Honey production in the world, in the European Union and in Hungary
4. The typical bee pasture in Hungary (oilseed rape – *Brassica napus* L., black locust – *Robinia pseudoacacia* L., sunflower *– Helainthus annuus* L. and other wild bee pasture)
5. The basic beekeeping equipment park (harvesting honey, equipment for the treatment of honeybees, protective clothing, types of beehives and frames)
6. Bee procucts: types of honey, royal jelly, pollen, bee wax, bee venom)
7. The disease of the european honeybees I. *Varroa destructor*
8. The disease of the european honeybees II. *Nosema apis.*
9. The disease of the european honeybees III. *Paenibacillus larvae*.
10. 12 months of beekeeping
11. The methods of honey harvesting.
12. The methods of stimulation feeding of honeybees.
13. Changing of bee pasture: moving with beehves.
14. Legal requirements and legal bases for beekeeping
15. Mandatory annual controlling (veterinarian and honeybee-health responsible person)
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| **Summary of content - practice**: |
| Skills to be learnt: 1. The importance of pillinisation by honeybees (ecological services)
2. The biology of *Apis mellifera*, the social behaviour of european honeybees
3. Honey production in the world, in the European Union and in Hungary
4. The typical bee pasture in Hungary (oilseed rape – *Brassica napus* L., black locust – *Robinia pseudoacacia* L., sunflower *– Helainthus annuus* L. and other wild bee pasture)
5. The basic beekeeping equipment park (harvesting honey, equipment for the treatment of honeybees, protective clothing, types of beehives and frames)
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| **Literature, handbooks in English**  |
| 1. Diana Sammataro, Alphonse Avitabile: The beekeeping handbook. Fourth edition. 2011. ISBN: 0801476945.
2. Jamie Stebens: Beekeeping for beginners. A starter guide book on the basics to keeping bees and harvesting honey. 2014.
3. Joachim Petterson: Beekeeping: on bees, beekeeping and bee products. 2016. ISBN: 1681881543.
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| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**
* Familiar with the theory of breeding, animal production, processing, and selling, together with its practical implementation possibilities.
* Familiar with the basic rules of animal husbandry, breeding, animal welfare and animal welfare, animal health management
1. **Skills:**
* Capable of planning, organizing and managing the processes of breeding, production, processing and marketing of animal products.
* Able to produce livestock farming, animal breeding research development tasks, and coordinate advice
1. **Attitude:**
* Responsive to the use of sustainable, environmentally friendly methods.
* Recognizes the problems and seeks to solve them on a high level based on the acquired animal husbandry skills.
1. **Autonomy and responsibility:**
* Decides independently on the development of breeding and breeding strategies of the sector or population, which is managed.
* Responsible for the safety of food and feed produced with the help of it.
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| **Responsible lecturer: Dr. Oláh János (senior research fellow)** |
| **Other lecturer(s): Marianna Takács (predoctoral fellow)**  |

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| **Terms of course completion:** |
| 1. Writing an essay or report (student can decide which one to choose)
2. Giving presentation (beekeeping practice where he/she came from)
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| **Form of examination:** |
| 1. Oral exam and writing the report on practice (field program: honey manufacture, apiary visiting)
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| **Requirement(s) to get signature:** |
| Regular visits to lectures (maximum: 2 absences) and compulsory participation in exercises (visit to beekeeping and honey manufacture).Attendance at lectures is recommended, but not compulsory.Participation at practice is compulsory. Students must attend the practice classes and may not miss more than two times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at practice classes will be recorded by the practice leader. Missed practices should be made up for at a later date, being discussed with the lecturer. Active participation is evaluated by the teacher.**Exercise 1.** The aim of the course is to provide the audience with an up-to-date knowledge of the biology of bees, social behaviour, parasites, pests, applied technologies and bee products. Students come from different countries. Within the framework of the beekeeping subject taught at the University of Debrecen Faculty of Agricultural and Food Sciences, and Environmental Management they acquire only the knowledge of beekeeping in a few European countries and get a full picture of the beekeeping practice in Hungary.By presenting beekeeping practices in their own country, the students can also get an insight into the apiculture activities of more distant countries, including Mongolia, Pakistan, Turkey.During the preparation of the presentation, the students study foreign literature, during which the foreign language skills are also developing.In the case of foreign students, the presentation in English also has a positive effect on the development of communicative skills and also facilitates the expression of oral examinations. During the preparation of the presentation, the students will get acquainted with the skills necessary for collecting the literature. They can learn how to collect relevant literature. It is important that students learn the logical steps of preparing a presentation. **Exercise 2.**Writing a practical report or an essay about the beekeeping practice: The need to prepare an essay or report is to enable students to learn the steps of writing scientific manuscripts, the content elements of each chapter, and the steps of studying the literature. Students often come across scientific manuscripts during their university studies, and these practical tasks can help to analyse them.In the framework of the course, we plan to visit a honey manufacture and an apiary where students can meet all the elements of the beekeeping equipment park and make notes for the essay or report. They can also listen to the reports of Hungarian experts on beekeeping activities.  |

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| **Exam questions:** |
| 1. Characterize the position of honey production! (world, European Union, Hungary)
2. Characterize the development of bee density! (world, European Union, Hungary)
3. Describe the difference between *Apis mellifera carnica, Apis mellifera mellifera, Apis mellifera ligustica* and *Apis mellifera caucasica*! (country/countries where native, susceptibility to diseases, honey production, behaviour during beehives-opening).
4. Describe the concept of the bee pasture, the causes of its degradation and the possibilities for its repair!
5. List and characterize the most important bee pasture crops in Hungary!
6. Characterize the position of acacia (black locust (*Robinia pseudoacacia* L.) in Hungary!
7. What are the factors affecting pollination?
8. Characterize the morphological structure of the honeybees (head, thorax, abdoman)!
9. What are the most important species stamps for the *Apis mellifera* honey species?
10. Describe the caste within the honeybee colony! (queen bee, worker, drone)
11. What factors affect the behavior of honeybees?
12. What are the most important factors in heat management within the beehive?
13. What are the most common types of beehives in Hungary?
14. What are the advantages and disadvantages of a loading beehives?
15. What are the advantages and disadvantages of a lying beehives?
16. Describe the purpose, necessity and risk of moving with beehives!
17. Describe the practices and tools of good honey harvesting!
18. Describe the structure and function of the winter honeybee cluster!
19. What are the most important spring work in the apiary?
20. Describe the notation system of queen bee!
21. Describe the development, damage of the varroa mite (*Varroa destrcutor*)!
22. List the currently usied active ingredients against *Varroa destructor*!
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