COURSE OUTLINE

1. GENERAL INFORMATION

FACULTY/SCHOOL	SCHOOL OF PLANT SCIENCES		
DEPARTMENT	CROP SCIENCE		
LEVEL OF STUDY	*Undergraduate*		
COURSE UNIT CODE	905	**Semester:**	9th
COURSE TITLE	Pathology of Productive insects		
INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHNG HOURS**	**ECTS**
Lectures		3	3
Laboratory Exersices		2	2
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4			
COURSE TYPE *Background knowledge, Scientific expertise, General Knowledge, Skills Development*	*Scientific expertise*		
PREREQUISITE COURSES:	Apiculture - Sericulture		
LANGUAGE OF INSTRUCTION:	Greek		
LANGUAGE OF EXAMINATION/ASSESSMENT:			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes (in English)		
COURSE WEBSITE (URL)	http://efp.aua.gr/el/beelab		

2. LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

Upon successful completion of the course (theory and laboratory), students should be able to (descriptive indicator 6, 7 of the European Qualifications Framework):

- Understand the symptomatology, etiology, biology, and epidemiology of the major mycological, protozoal, viral, and non-parasitic diseases of bees and the silkworm, as well as the main pests of bees, the silkworm, and the mulberry tree.
- Possess skills in designing management programs (conventional, biological, and integrated) for the pests and diseases of bees, the silkworm, and the mulberry tree.
- Be capable of effectively implementing, according to the methods of proper beekeeping practice, management programs (conventional, biological, and integrated) for the pestsand diseases of bees and the silkworm, and be

able to update and evaluate cutting-edge issues related to the pests and diseases of bees, the silkworm, and the mulberry tree.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Environmental awareness*
Individual/Independent work	*Social, professional and ethical responsibility and sensitivity to gender issues*
Group/Team work	*Critical thinking*
Working in an international environment	*Development of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Introduction of innovative research	*(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)*
	…….

• **Adaptation to new situations:** Special emphasis is placed on the biological management of diseases, resulting in the search for new techniques and substances that will provide integrated management and safe products.
• **Decision-making:** Disease control is often preventive, which requires good planning throughout the year to maintain pathogen levels at acceptable levels. The selection of methods and timing requires a good understanding of both the organism's biology and the mode of action of the selected control products.
• **Autonomous work:** Several agricultural scientists may be interested in exclusively dealing with beekeeping or sericulture, becoming specialized with extensive knowledge as producers.
• **Teamwork:** Strong economic pressures of the era often require the formation of producer groups to enhance competitiveness.
• **Generation of new research ideas:** Particularly in the field of disease control, data changes rapidly, making it crucial to adapt and find new friendly formulations with good effectiveness.
• **Respect for the natural environment:** Beekeeping, by definition, is directly connected to nature, as beekeepers utilize flowerings and nectar without being able to influence their development. In this sense, beekeepers act as protectors of nature and contribute significantly to pollination. Any negative impact on the natural environment will directly affect bees.
• **Demonstration of social, professional, and ethical responsibility:** The consumer's demand for pesticide-free products increasingly drives the use of friendly and effective formulations, applied at the right time by the producer. Knowledge in this direction provides a significant asset to the new graduate.

3. COURSE CONTENT

The natural defense mechanisms of bees, Bee diseases (sacbrood, American and European foulbrood, chalkbrood, aspergillosis, nosemosis, viral infections), Bee pests (Mites: Varroa and Tracheal Mites, insects: wax moth, wasps, ants, small hive beetle, birds, mammals), Non-parasitic bee diseases - bee toxicities from pesticides, biocides, toxic plants. Beekeeping practices for managing bee diseases and pests, disinfection of beekeeping and sericulture materials. Silkworm diseases (fungus-related: *Beauveria bassiana*, pebrine, protozoan-related: *Bacillus thuringiensis*, viral-related: Bombyx mori nuclear polyhedrosis virus (BmNPV), Bombyx mori cytoplasmic polyhedrosis virus (BmCPV), Bombyx mori infectious flacherie virus (BmIFV), non-parasitic diseases), Enemies of silkworms (Tachinidae, Dermestidae), and mulberry (powderpost beetles, *Xylotrechus chinensis*).

4. TEACHING METHODS--ASSESSMENT

MODES OF DELIVERY *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	In-class lecturing

USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in teaching, Laboratory Education, Communication with students*	Use of slide presentation and blackboard. Communication with students. Learning process support by access to e-class asynchronous distance learning platform.
COURSE DESIGN *Description of teaching techniques, practices and methods:* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.*	

Activity/ Method	Semester workload
Lectures	39
Laboratory practice	26
Study and analysis of literature	10
Personal study	24
Field study	16
Sample demonstration	10
Total of Course (25 hours of workload per ECTS)	***125***

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc.* *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.*	**I. Final written exam in the theory of the course** including a combination of short-answer questions, open-ended questions and multiple choice questions. **II. The written examination in the laboratory part of the course** includes short answer, open-ended, problem solving and documentation questions, as well as sample recognition (the ability to apply the principles and mechanisms and the way of approaching and documenting the answer is evaluated).

5. SUGGESTED BIBLIOGRAPHY:

Books

1. Harizanis, P. 2015. Notes on Pathology of Productive Insects. Agricultural University of Athens, 2015.
2. Harizanis, P. 2015. Laboratory Exercises on Pathology of Productive Insects. Agricultural University of Athens, 2015.
3. Caron, D.M. and L.J. Connor. 2022. Honeybee Biology and Beekeeping (Revised Edition). Wicwas Press, USA.
4. Yfantidis, M. 2005. Diseases of the Bee. Non-conventional Methods of Treatment. Melissokomiki Epitheorisi Publications.

Scientific Journals

1. Journal of Apicultural Research
2. Apidologie.

6. TEACHERS

-Theory:

Assistant Professor G. Goras, Assistant Professor A. Tsagkarakis

- **Laboratory:**
Assistant Professor G. Goras, Assistant Professor A. Tsagkarakis, Reasearch & Teaching Associate D. Lazarakis