COURSE OUTLINE

1. GENERAL

SCHOOL	APPLIED ECONOMIC AND SOCIAL SCIENCES		
ACADEMIC UNIT	AGRIBUSINESS AND SUPPLY CHAIN MANAGEMENT		
LEVEL OF STUDIES	*Undergraduate*		
COURSE CODE	**5504**	**SEMESTER**	5th
COURSE TITLE	AGRICULTURAL ZOOLOGY AND ENTOMOLOGY		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	5	5

COURSE TYPE	General Background
PREREQUISITE COURSES	NO
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek
IS THE COURSE OFFERED for ERASMUS STUDENTS?	YES (in English)
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/

2. LEARNING OUTCOMES

Learning Outcomes

The aim of the course is:

• Students to acquire knowledge on the organization, form, function and diversity of animal organisms.
• Students to understand the position and the role of various animal organisms in the Animal Kingdom and their role in the environment and agriculture, in particular.

Upon successful completion of the course, the student:

• Will acquire skills in the management of animal organisms in order to reduce the harmful and increase their beneficial effects on animal production, agriculture and the environment in general.
• Will become familiar with the morphology, anatomy - physiology and systematics of insects, with the symptoms of insect and mite infestations and the damage they cause to crop plants and stored products.
• Will be able to recognize the symptoms of phytoparasitic and zooparasitic nematodes.

General Competences

Adapting to new situations

Decision-making

Working independently

Teamwork

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas Teamwork

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional, and ethical responsibility and sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

3. SYLLABUS

1. Introduction. Sectors of zoology, importance of agricultural - applied zoology.
2. The chemical basis of animal organisms, special characters of the animal cell. Form, organization and functions of animal organisms.
3. Systematic zoology, zoological nomenclature, classification, phylogeny, origin and evolution of animal organisms. The main Phyla of agricultural importance.
4. Elements of agricultural zoology and entomology with emphasis on morphology, biology, ecology, recognition and role, as well as the management of primates, platyhelminthes, nematodes, ringed worms, insects, mites and rodents.
5. The fauna of natural ecosystems. The importance and diversity of insects, their position in the genus Arthropods. Phylogenetic origin of insects, the evolution of insects and biogeography. Insect communities.
6. Morphology - Body wall, cuticular outgrowths of the exoskeleton. Head: types and parts of the head. Components, organs: eyes, antennas, mouthparts, types of mouthparts. Endoskeleton of the head. Thorax: thoracic components, types of legs, way of movement of insects, origin, formation, species and connection of the wings, endoskeleton of the thorax. Abdomen: construction, reproductive components, crests, pseudopods, lamellar gills, centrifugal sting of hymenoptera.
7. Anatomy - Physiology of insects: 1. Digestive system: Parts and organs, glands, mechanism and physiology of digestion, nutrition and metabolism. 2. Circulatory system: blood lymph, spinal vessel, function of blood lymph circulation.
8. 3. Excretory system: Malpighian tubule, nephrocytes, labial glands. 4. Muscular system: the mechanism of flight and the muscles.
9. 5. Respiratory system: trachea, respiratory holes, mechanism and physiology of respiratory function. Aquatic insect respiration, respiratory metabolism.
10. 6. Nervous system: nerve cell, cell types, ganglia, nerves, insecticidal activity and nervous system. Nervous system organization (Brain, Gnatcephalus, Abdominal ganglion chain and their subdivisions).
11. Insect senses: i) sight (compound and simple eyes, mode of vision, light-producing organs), ii) hearing (types of hearing organs), iii) touch, iv) smell, v) taste and other senses. Special secretions of insects.
12. 7. Reproductive system: sexoual reproduction, male and female reproductive organs, mating, eggs, fertilization, embryonic or post-embryonic development. Insect metamorphosis: identification of holometabolous insect larvae. Insects and

global climate change and trade.

13. Class Insecta. Classification of insects by classes. Description, biology, ethology, and control of major pests of agricultural importance and other pests per class: Principles of control of harmful species.

A combination of teaching and learning methods will be used, aiming at the active participation of the students and the practical application of the thematic units under examination; there will also be lectures using audiovisual media, discussions, and analyses of case studies on real business issues, experiential (group) activities, as well as projections of relevant videos. The students will also undertake an individual or group project. Furthermore, articles, audiovisual lecture materials, web links/addresses, useful information, case studies and exercises for further practice are posted in digital form on the AUA Open e-Class platform.

4. TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY</td><td>Face -to-face, Distance learning</td></tr>
<tr><td>USE OF INFORMATION and COMMUNICATIONS TECHNOLOGY</td><td>• Support of the learning process through the University's AUA Open eClass platform (integrated e-Course Management System)
• Support of lectures using presentation software
• Use of audiovisual material
• Use of web applications

Communication with students: face to face at office hours, email, eclass platform</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Workload</th></tr>
<tr><td>Lectures (direct)</td><td>65</td></tr>
<tr><td>Writing paper/ papers</td><td>28</td></tr>
<tr><td>Independent Study</td><td>30</td></tr>
<tr><td>Advisory support</td><td>0,5</td></tr>
<tr><td>Exams</td><td>2</td></tr>
<tr><td>Course Total (Approximately 25 hours of workload per credit unit 125.5)</td><td>125,5 h</td></tr>
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</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION</td><td>The evaluation process is in the language that the course is taught (Greek or English) and consists of:
i. Compulsory written final examination at the end of the semester (weighting factor 70% at least) which may includes:
• Multiple choice questionnaires
• Open-ended questions
• Problem solving
• Oral examination
Evaluation criteria: correctness, completeness, clarity</td></tr>
</table>

	ii. Optional written exam or essay during the semester (weighting factor 30%) which may includes: • Multiple choice questionnaires • Open-ended questions • Problem solving • Essay/report • Oral examination **Evaluation criteria:** correctness, completeness, clarity **Special learning difficulties:** Students with **special learning difficulties** in writing and reading (as they are certified and characterized by a competent body) are examined based on the procedure provided by the Department. **Specifically-Defined Criteria:** The evaluation criteria are made known during the first lesson and are clearly stated on the course website and the AUA Open e-class platform. The answers to the exam questions are posted on the AUA Open e-Class platform after the exam. The students are allowed to see their exam paper after its grading (during the announced office hours) and receive explanations about the grade they received.

5. ATTACHED BIBLIOGRAPHY

Suggested Bibliography in Greek Language:

- Van Emden H.F. 2014. Γεωργική Εντομολογία. Επιμέλεια: Ν. Εμμανουήλ.
- Τζανακάκης, Μ.Ε., Κατσόγιαννος, Β.Ι. 2003. Έντομα καρποφόρων δέντρων και αμπέλου.
- Εμμανουήλ, Γ. Ν. 1998. Γεωργική Ζωολογία σελ. 315 Γ.Π.Α.
- Εμμανουήλ, , Γ. Ν. 1995. Γεωργική Ζωολογία, Ειδικό Μέρος Α΄ Φυτοφάγα Είδη

Suggested Bibliography in English Language:

- Gullan P. J. and P. S. Cranston 2014. The Insects: An Outline of Entomology, 5th Edition.
- Nation J.L. 2011. Insect Physiology and Biochemistry, Second Edition - CRC Press Book.
- Hill D.S. 2009. Agricultural Entomology.
- Borror and DeLong, 2005. Introduction to the Study of Insects. 7th Edition.
- HICKMAN, JR. C., L. S. ROBERTS, A. LARSON, 1996. Integrated principles of Zoology. Wm. C. Brown Publishers p.p. 901.

- BAKONYI G., 1995. Allattan (Zoology) MEZOGAZDA, p.p. 699.
- MILLER S. A. AND J. P. HARLEY, 1992. Zoology. Wm. C. Brown Publishers p.p.664.
- DORIT, R.L., WALKER, R. D., BARNES, 1991. Zoology. Saunders college publishing p.p. 1099.

Related academic Journals:

- Journal of Stored Products Research
- Journal of Insect Science
- Journal of Economic Entomology
- Entomologia Generalis
- Insects
- Crop Protection
- Journal of Pest Science
- Pest Management Science
- Journal of Food Protection
- Journal of Applied Entomology
- Entomologia Experimentalis et Applicata
- Bulletin of Entomological Research
- ZooKeys
- Zootaxa
- International Journal of Acarology
- Experimental and Applied Acarology

Instructor's Notes