

COURSE OUTLINE

1. GENERAL

| | | | |
|--|---|------------------------------|----------------|
| SCHOOL | APPLIED ECONOMIC AND SOCIAL SCIENCES | | |
| ACADEMIC UNIT | AGRIBUSINESS AND SUPPLY CHAIN MANAGEMENT | | |
| LEVEL OF STUDIES | <i>Undergraduate</i> | | |
| COURSE CODE | 5609 | SEMESTER | 6th |
| COURSE TITLE | STORED PRODUCT AND URBAN PESTS | | |
| INDEPENDENT TEACHING ACTIVITIES | | WEEKLY TEACHING HOURS | CREDITS |
| Lectures | | 5 | 5 |
| COURSE TYPE | Special Background, Skills Development | | |
| kills | 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 |
| <p>The aim of the course is:</p> <ul style="list-style-type: none"> • The knowledge on the symptoms that are caused to the stored products, the ability to examine stored products and decide about the severity of any infection that is related to insects, mites and rodents. • Pest management. • The knowledge on pest of urban environment. <p>Upon successful completion of the course, the student:</p> <ul style="list-style-type: none"> • Will have been supplied with knowledge on the morphology, systematics, biological cycles, ecology, risk and modern methods concerning the management of pests (i.e., insects, mites, rodents) that infest stored products and urban environment. |
| General Competences |
| <p>Adapting to new situations</p> <p>Decision-making</p> <p>Working independently</p> <p>Teamwork</p> <p>Working in an international environment</p> <p>Working in an interdisciplinary environment</p> |

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

Theory

1. Stored-product pests: general aspects and importance. Synergism and associations with biotic and abiotic factors.
2. Primary stored-product insects: morphology, biology, ecology, symptoms, identification of Lepidoptera: *Sitotroga cerealella* and Coleoptera: *Sitophilus oryzae*, *Sitophilus granarius*, *Sitophilus zeamais*, *Rhyzopertha dominica*, *Prostephanus truncatus*, *Trogoderma granarium*, *Acanthoscelides obtectus*, *Bruchus pisorum*, *Bruchus rufimanus*, *Bruchus lentis*.
3. Secondary stored-product insects: morphology, biology, ecology, symptoms, identification of Lepidoptera: *Ephestia kuehniella*, *Ephestia elutella*, *Plodia interpunctella*, *Tinea granella*, Psocoptera: *Liposcelis bostrychophila*, and Coleoptera: *Tribolium confusum*, *Tribolium castaneum*, *Tenebrio molitor*, *Tenebroides mauritanicus*.
4. Secondary stored-product insects: morphology, biology, ecology, symptoms, identification of Coleoptera: *Oryzaephilus surinamensis*, *Oryzaephilus mercator*, *Cryptolestes ferrugineus*, *Lasioderma serricorne*, *Carpophilus hemipterus*, *Anthrenus* spp., and *Attagenus* spp.
5. Stored-product mites: morphology, biology, ecology, symptoms, identification of Astigmata: Acaridae and Glycyphagidae.
6. Stored-product mites: morphology, biology, ecology, symptoms, identification of Mesostigmata, Prostigmata and Cryptostigmata.
7. Rodents: identification
8. Rodents: biology, damages
9. Pest management: natural (extreme temperatures).
10. Pest management: chemical (fumigants, contact insecticides).
11. Pest management: alternative methods.
12. Pests in urban areas: morphology, biology, ecology, symptoms, identification, management of Dictyoptera, Siphonaptera, Hemiptera, Anoplura, and Psoroptidae.
13. Pests in urban areas: morphology, biology, ecology, symptoms, identification, management of Diptera (Muscidae, Tabanidae, Psychodidae, Sarcophagidae, Simuliidae, Ceratopogonidae, Culicidae), Psoroptidae, Sarcoptidae, Demodicidae, Ixodidae, and Argastidae.

Laboratory exercises

1. Primary stored-product insects: sampling, identification of adults and immatures of Lepidoptera: *Sitotroga cerealella* και Coleoptera: *Sitophilus oryzae*, *Sitophilus granarius*, *Sitophilus zeamais*.

2. Primary stored-product insects: sampling, identification of adults and immatures of Coleoptera: *Rhyzopertha dominica*, *Prostephanus truncatus*, *Trogoderma granarium*, *Acantosceldes obtectus*, *Bruchus pisorum*, *Bruchus rufimanus*, *Bruchus lentis*.
3. Secondary stored-product insects: sampling, identification of adults and immatures of Lepidoptera: *Ephestia kuehniella*, *Ephestia elutella*, *Plodia interpunctella*, *Tinea granella* και Psocoptera: *Liposcelis bostrychophila*.
4. Secondary stored-product insects: sampling, identification of adults and immatures of Coleoptera: *Tribolium confusum*, *Tribolium castaneum*, *Tenebrio molitor*, *Tenebroides mauritanicus*.
5. Secondary stored-product insects: sampling, identification of adults and immatures of Coleoptera: *Oryzaephilus mercator*, *Cryptolestes ferrugineus*, *Lasioderma serricorne*, *Carpophilus hemipterus*, *Anthrenus* spp., *Attagenus* spp.
6. Collection of mites from samples of stored products.
7. Identification of major genera and species of stored-product mites (Astigmata: Acaridae, Glycyphagidae).
8. Identification of major genera and species of stored-product mites (Mesostigmata, Prostigmata, Cryptostigmata).
9. Rodents: identification of species and infestations.
10. Chemical management (conduct insecticides, fumigants).
11. Devices for sampling and/ or management of stored-product insects.
12. Identification of major insect species in urban areas: Dictyoptera, Siphonaptera, Hemiptera, Anoplura, and Psoroptidae.
13. Identification of major insect and mite species in urban areas: Diptera (Muscidae, Tabanidae, Psychodidae, Sarcophagidae, Simuliidae, Ceratopogonidae, Culicidae), Psoroptidae, Sarcoptidae, Demodicidae, Ixodidae, Argastidae.

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

| | | |
|---|--|-----------------|
| DELIVERY | Face -to-face, Distance learning | |
| USE OF INFORMATION and COMMUNICATIONS TECHNOLOGY | <ul style="list-style-type: none"> • 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 <p>Communication with students: face-to-face at office hours, email, eclass platform</p> | |
| TEACHING METHODS | <i>Activity</i> | <i>Workload</i> |
| | Lectures (direct) | 39 |
| | Laboratory Practice | 26 |

| | | |
|---------------------------------------|---|--------------|
| | Essay Writing | 20 |
| | Autonomous study | 36 |
| | Advisory Support | 0,5 |
| | Examination | 2 |
| | Laboratory Examination | 2 |
| | <i>Total</i> <i>(About 25 hours of study per ECTS)</i> | 125,5 |
| STUDENT PERFORMANCE EVALUATION | <p>The evaluation process is in the language that the course is taught (Greek or English) and consists of:</p> <ol style="list-style-type: none"> i. Compulsory written final examination at the end of the semester (weighting factor 70% at least) which may includes: <ul style="list-style-type: none"> • Multiple choice questionnaires • Open-ended questions • Problem solving • Oral examination <p>Evaluation criteria: correctness, completeness, clarity</p> ii. Optional written exam or essay during the semester (weighting factor 30%) which may includes: <ul style="list-style-type: none"> • Multiple choice questionnaires • Open-ended questions • Problem solving • Essay/report • Oral examination <p>Evaluation criteria: correctness, completeness, clarity</p> <p>Special learning difficulties:</p> <p>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.</p> <p>Specifically-Defined Criteria:</p> <p>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.</p> | |

5. ATTACHED BIBLIOGRAPHY

Suggested Bibliography in Greek Language:

- Σταμόπουλος, Δ., 2013. Εχθροί Αποθηκευμένων Προϊόντων, Μουσείων και Κατοικιών, Πανεπιστημιακές Εκδόσεις Θεσσαλίας, Βόλος.
- Δίπτερα υγειονομικής σημασίας, 1999, Ν. Γ. Εμμανουήλ
- Έντομα αποθηκευμένων γεωργικών προϊόντων και τροφίμων, 1996, Κ. Θ. Μπουχέλος
- Τζανακάκης, Μ., 1995. Εντομολογία. University Studio Press, Θεσσαλονίκη.

Suggested Bibliography in English Language:

- Hagstrum, D.W., Phillips, T.W., Cuperus, G. (Eds.) 2012. Stored Product Protection. Kansas State University, Manhattan, KS, pp. 297-304.
- Hubert, J., 2012. The pest importance of stored product mites (Acari: Acaridida). Nova Science Publishers Inc, New York.
- Begall, S., Burda, H., Schleich, C.E. (Eds.), 2007. Subterranean rodents. News from underground. Springer, Berlin.
- Hill, D.S., 2003. Pests of storage foodstuffs and their control. Kluwer Academic Publishers, New York, NY.

Related academic Journals:

- Acta Tropica
- International Journal of Mosquito Research
- 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