

## COURSE OUTLINE

### 1. GENERAL INFORMATION

<b>FACULTY/SCHOOL</b>	SCHOOL OF PLANT SCIENCES		
<b>DEPARTMENT</b>	CROP SCIENCE		
<b>LEVEL OF STUDY</b>	Undergraduate		
<b>COURSE UNIT CODE</b>	211	<b>Semester:</b>	9th
<b>COURSE TITLE</b>	Pests of Arable and Greenhouse Crops		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>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</i>	<b>WEEKLY TEACHING HOURS</b>	<b>ECTS</b>	
Lectures	3	3	
Laboratory Exercises	2	2	
<i>Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4</i>			
<b>COURSE TYPE</b> <i>Background knowledge, Scientific expertise, General Knowledge, Skills Development</i>	Scientific expertise		
<b>PREREQUISITE COURSES:</b>	General and Systematic Agricultural Zoology General and Systematic Agricultural Entomology		
<b>LANGUAGE OF INSTRUCTION:</b>	Greek		
<b>LANGUAGE OF EXAMINATION/ASSESSMENT:</b>			
<b>THE COURSE IS OFFERED TO ERASMUS STUDENTS</b>	Yes (in English)		
<b>COURSE WEBSITE (URL)</b>			

### 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

The subject of the course "Pests of Arable and Greenhouse Crops" is to familiarize students, on a theoretical and practical level, with the morphology, biology, ethology, symptomatology, economic significance, and control of the pests that affect arable and greenhouse crops.

After successfully completing the course, students will acquire knowledge, skills, and abilities in the following subjects:

1. Symptomatology of infestations by pests in field and greenhouse crops.
2. Economic significance, methods, and means of controlling pests in each crop.
3. Pests of cotton, tobacco, and industrial tomato.
4. Pests of cereals.
5. Pests of maize and rice.

6. Pests of winter cereals.
7. Pests of livestock and edible legumes.
8. Pests of horticultural and floricultural greenhouse crops.
9. Soil insects.

### 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,

Adapting to new situations

Decision-making

Individual/Independent work

Group/Team work

Working in an international environment

Working in an interdisciplinary environment

Introduction of innovative research

Project planning and management

Respect for diversity and multiculturalism

Environmental awareness

Social, professional and ethical responsibility and sensitivity to gender issues

Critical thinking

Development of free, creative and inductive thinking

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(Other.....citizenship, spiritual freedom, social awareness, altruism etc.)

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The purpose of the laboratory is to familiarize students and develop skills related to:

1. Morphology and identification of pests that damage arable and greenhouse crops.
2. Identification of symptoms/infestations they cause.
3. Methods and means for their control.

### 3. COURSE CONTENT

#### Pests of Industrial Crops

Morphology, biology, symptomatology, ecology, and management of pests of: • Cotton, such as *Pectinophora gossypiella* (pink bollworm), *Helicoverpa armigera* (cotton bollworm), *Tetranychus urticae*, *Polyphagotarsonemus latus*, • Tobacco, such as *Thrips tabaci*, *Bemisia tabaci*, *Myzus persicae*, etc., • Industrial tomato, such as *Tuta absoluta*, *Helicoverpa armigera*, *Liriomyza* spp., Aphididae (aphids), *Aculops lycopersici*, *Polyphagotarsonemus latus*, *Meloidogyne* spp., etc., • Beet, such as *Cassida nebulosa*, *Cleonus medicus*, *Globodera rostochiensis*, etc.

**Pests of Potato:** Morphology, biology, symptomatology, ecology, and management of enemies such as *Leptinotarsa decemlineata* (Colorado potato beetle), *Phthorimaea operculella* (potato tuberworm), etc.,

**Pests of Corn and Rice:** Morphology, biology, symptomatology, ecology, and management of enemies such as *Sesamia nonagrioides*, *Helicoverpa armigera*, *Tetranychus urticae*, etc.

**Pests of Winter Cereals:** Morphology, biology, symptomatology, ecology, and management of enemies such as Orthoptera (grasshoppers), Heteroptera (cereal bugs), *Zabrus tenebrioides* (darkling beetle), *Bryobia praetiosa*, *Steneotarsonemus* spp., etc.

**Pests of Livestock and Edible Legumes:** Morphology, biology, symptomatology, ecology, and management of enemies such as Orthoptera (grasshoppers), Curculionidae (beetles), Aphididae (aphids), Tetranychidae, Eriophyidae, etc.

**Pests of Vegetable and Floricultural Greenhouse Crops:** Morphology, biology, symptomatology, ecology, and management of enemies such as Thripidae, Aleyrodidae, Aphididae, *Tuta absoluta*, foliage-feeding Lepidoptera, Tetranychidae, Eriophyidae, Tarsonemidae, etc.

**Soil Insects:** Morphology, biology, symptomatology, ecology, and management of insects such as Scarabaeidae (white grubs), Elateridae (wireworms), Noctuidae (cutworms, armyworms), **Gryllotalpa gryllotalpa**.

**Plant Parasitic Nematodes of Field and Greenhouse Crops:** Differentiation of plant-parasitic nematodes of field and greenhouse crops. Management with cultural, biological, natural, and chemical methods. Relationship between plant pathogens and nematodes (Bacteria, Fungi, Mycorrhizae, Viruses). Plant pathology in the infestation by nematodes. Plant resistance to nematodes in field and greenhouse crops.

**Rodents in Field and Greenhouse Crops:** Estimation of damages, management with mechanical, biological, cultural, and chemical methods."

#### 4. TEACHING METHODS--ASSESSMENT

<p><b>MODES OF DELIVERY</b> <i>Face-to-face, in-class lecturing, distance teaching and distance learning etc.</i></p>	In-class lecturing																	
<p><b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</b> <i>Use of ICT in teaching, Laboratory Education, Communication with students</i></p>	Use of slide presentation and blackboard. Communication with students. Learning process support by access to e-class asynchronous distance learning platform.																	
<p><b>COURSE DESIGN</b> <i>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.</i></p> <p><i>The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</i></p>	<table border="1"> <thead> <tr> <th data-bbox="730 598 1046 633">Activity/ Method</th> <th data-bbox="1051 598 1366 633">Semester workload</th> </tr> </thead> <tbody> <tr> <td data-bbox="730 640 1046 669">Lectures</td> <td data-bbox="1051 640 1366 669">39</td> </tr> <tr> <td data-bbox="730 676 1046 705">Laboratory practice</td> <td data-bbox="1051 676 1366 705">13</td> </tr> <tr> <td data-bbox="730 712 1046 801">Individual laboratory project (data processing and commenting)</td> <td data-bbox="1051 712 1366 801">30</td> </tr> <tr> <td data-bbox="730 808 1046 837">Personal study</td> <td data-bbox="1051 808 1366 837">32</td> </tr> <tr> <td data-bbox="730 844 1046 873">Field study</td> <td data-bbox="1051 844 1366 873">3</td> </tr> <tr> <td data-bbox="730 880 1046 909">Field training visits</td> <td data-bbox="1051 880 1366 909">8</td> </tr> <tr> <td data-bbox="730 938 1046 1003"><b>Total of Course (25 hours of workload per ECTS)</b></td> <td data-bbox="1051 938 1366 1003"><b>125</b></td> </tr> </tbody> </table>		Activity/ Method	Semester workload	Lectures	39	Laboratory practice	13	Individual laboratory project (data processing and commenting)	30	Personal study	32	Field study	3	Field training visits	8	<b>Total of Course (25 hours of workload per ECTS)</b>	<b>125</b>
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<p><b>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS</b> <i>Detailed description of the evaluation procedures:</i></p> <p><i>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.</i></p> <p><i>Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.</i></p>	<p><b>I. Final written exam in the theory of the course</b> including a combination of short-answer questions, open-ended questions and multiple choice questions.</p> <p><b>II. The written examination in the laboratory part of the course</b> 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).</p>
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#### 5. SUGGESTED BIBLIOGRAPHY:

<p><b>Books</b></p> <ol style="list-style-type: none"> <li>1. Perdikis D., Kapaxidi E. and Papadoulis G. 2008. Biological Control of Insect and Mite Pests in Greenhouse Solanaceous Crops. The European Journal of Plant Science and Biotechnology, Vol. 2, Special Issue 1, pp. 125-144</li> <li>2. Agricultural Zoology, Special Part: Herbivorous Species. 2004, N.G. Emmanouil.</li> <li>3. Cotton, Tobacco, Potato, Cereal, and Legumes Insects. 2005, K.T. Buchelos.</li> <li>4. Crop pests in Greenhouses. 1994, X. Giamvrias.</li> <li>5. H.F. Van Emden 2014. Agricultural Entomology. Edited by N. Emmanouil.</li> <li>6. Heinz K.M., Parrella M.P., and Van Driesche R.M. 2004. Biocontrol in Covered Crops.</li> <li>7. Tolis, I.D. 1986. Cotton, Pests, Diseases, Weeds.</li> </ol>
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8. Tolis, I.D. 1995. Cultivation and Pest Control of Cotton in Greece.
9. Stamopoulos, D.K. 1995. Storage pests of Major Crops and Vegetables. Ziti Editions, Thessaloniki.
10. Pests and Diseases of Sugar Beet. 1982. Hellenic Sugar Industry. S.A.

#### **Scientific Journals**

1. Journal of Insect Science
2. Journal of Economic Entomology
3. Bulletin of Insectology
4. Crop Protection
5. Journal of Pest Science
6. Pest Management Science
7. Journal of Applied Entomology

#### **6. TEACHERS**

##### **-Theory & Laboratory:**

Professor G. Papadoulis, Professor I. Giannakou, Associate Professor D. Perdakis, Assistant Professor A. Tsagkarakis, Research & Teaching Associate E. Panou