

## COURSE SYLLABUS: 2019-20

Basic information on the course			
Course:	Crop Protection, Entomology and Plant Pathology		
Course code:	25154350	Plan:	Grado en Ingeniería Agrícola (Plan 2015)
Academic Year:	2019-20	Undergraduate/Graduate:	Grado
Degree Year:	4	Type:	Optional subject
Duration:	Second four-month period		
TIME DISTRIBUTION ACCORDING TO REGULATIONS			
Credits:	4,5		
Total time:	112,5		
<b>USE OF LEARNING PLATFORM:</b>	Teaching support		

TEACHERS			
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Name	<b>Santos Hernández, Milagrosa</b>		
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## OTHER IMPORTANT INFORMATION

### Content justification

The content of the matter will be developed both in species of arthropod pests and in the plant pathogens, for both cases, those that are of economic importance of the crops. In the first part of the course, the taxonomy, morphology, physiology, biology and behaviour of pests are dealt with. Aspects of agroecosystem and pest population dynamics, spatial distribution and sampling design, temporal distribution of populations; natural control and types of natural enemies; arthropod pest control methods: chemical methods, biological control, interference methods (hormones and semiochemicals), physical methods, agronomic methods and integrated control are also studied. In turn, the practical part of the course studies the taxonomy and pest recognition of extensive arable crops. Cereal pest species, legumes, industrial crops and stored products: descriptions, biology, ecology, damages, economic thresholds and control methods. In the second part, the agents causing plant diseases are studied. Types of diseases: infectious and non-infectious. Types of diseases and plant organs affected. Types of plants affected by diseases. Parasitic diseases: diagnosis, identification and treatment. The content of the course is structured in 4 theory blocks: Bases of Agricultural Entomology, fundamentals of Plant Pathology, characteristics of the most important pathogens and fundamentals of Plant Protection. 3 blocks of practices: Identification of pests and their natural enemies, diagnosis of diseases, diagnosis of damage and sampling methods.

### Courses related in Study Plan:

25104211 Química Agrícola y Desarrollo Vegetal 25102202 Fitotecnia 25103226 Cultivos Herbáceos Extensivos y Energéticos

### Pre-required knowledge:

25101106 Biología

## COMPETENCES

### Basic and general competences

#### *Basic competences*

- Understanding and possessing knowledge
- Application of knowledge
- Ability to make judgments
- Ability to learn

#### *General competences*

- Ability to make judgments.
- Ability to communicate and social aptitude.

### Key competences University of Almeria

- Ability to solve problems
- Capacity for criticism and self-criticism

- Ability to learn to work independently

## LEARNIGN OUTCOMES

**OBJECTIVES:** To know the bases of Agricultural Entomology and Plant Pathology and their location in Crop Protection. To know the arthropod species that cause damage. Study of the characteristics of insects and pest mites. Knowledge of chemical control methods against pest species. Study and know the natural enemies of arthropod pests. Know the biological control methods and application techniques. Know other methods of pest control. Study and know the main pest species in crops. Know the groups of plant pathogens. Diagnosis and evaluation of the damages produced by the diseases. Study and know the main crop diseases. **RESULTS OF THE LEARNING:** Capacity for the identification of pest species and plant pathogens in crops. Capacity to adopt measures to reduce crop losses of pests and diseases. Ability to search bibliography and other sources, to consult information necessary for decision making in the control of pests and agricultural diseases. Capacity for the management of pesticide products and their form of application. Ability to manage other methods of pest and disease control of crops.

## CONTENTS

### Blocks:

#### Block I: Agricultural Entomology

Unit 1. ANIMALS THAT ARE ENEMIES OF CROPS

Unit 2. INSECT MORPHOLOGY

Unit 3. INSECT BIOLOGY

Unit 4. SPIDER MITE MORPHOLOGY AND BIOLOGY

Unit 5. ECOLOGY OF ARTHROPOD PESTS

Unit 6. PEST CONTROL METHODS

#### Block II: Agricultural Entomology practices

SESSION 1. Collection, assembly and conservation of insects and mite pests of crops and study of the external morphology of arthropods.

SESSION 2. Identification of Orthoptera, Thysanoptera, and Hymenoptera of agricultural interest

SESSION 3: Identification of Lepidoptera, and Diptera of agricultural interest

SESSION 4: Identification of Hemiptera: Homoptera, and Heteroptera of agricultural interest

SESSION 5: Identification of Coleoptera, and spider mites of agricultural interest

#### Block III: Bases of the Plant Pathology

Unit 7: INTRODUCTION TO PLANT PATHOLOGY

Unit 8. ETIOLOGY AND DIAGNOSIS, THEIR IMPORTANCE IN CROP PROTECTION

SESSION 6: Diagnosis of plant diseases

**Block IV: Characteristics of the most important plant pathogens**

Unit 9: GENETICS OF RESISTANCE IN PLANT PATHOGENS

Unit 10: GROUP OF MOST IMPORTANT PATHOGENS: FUNGI

Unit 11: GROUP OF MOST IMPORTANT PATHOGENS: VIRUS

Unit 12: GROUP OF MOST IMPORTANT PATHOGENS: BACTERIA AND NEMATODES

SESSION 7: Fungal and bacterial plant diseases

SESSION 8: Evaluation of plant pathogen control agents

SESSION 9: Methods for identification of post-harvest diseases

ASSIGNMENT 1: Database management for plant protection and preparation of fact sheets

Unit 13: Post-harvest diseases

**Learning procedures and activities**

Class. Laboratory work. Study of cases. Search, consultation, and information processing. Reporting. Evaluation of results. Formulation of hypotheses and alternative.

**Teaching Innovation Activities**

**Functional diversity / Functional disability**

Those students with disabilities or special educational needs can get in contact with the Delegation of the Rector for the Functional Diversity (<http://www.ual.es/discapacidad>) to receive the appropriate guidance and advice in order to facilitate their instructional, learning and training processes. Likewise, these students may request the implementation of the necessary and suitable adaptations of content, methodology and evaluation that guarantee equal opportunities in their academic development. The processing of any personal data or aggregated information regarding these afore mentioned students, in fully compliance with the GDPR, is strictly confidential. Faculties and academic staff lecturing the course referenced by this guide/document will be in charge of applying the recommended adaptations approved by the Delegation of the Rector for the Functional Diversity, this fact will be, therefore, notified to the School or Faculty as well as to the coordinator of the academic course.

**COMPETENCY ASSESSMENT**

**Criteria and assessment tools**

Theoretical knowledge will be continuously evaluated by means of tests at the end of each thematic block, together with the work carried out individually and/or collectively by the students, attendance and participation in the theoretical classes (Ability to understand, possess and apply knowledge of the subject CB1, UAL1; as well as know how to apply their knowledge for the resolution of problems and control of pests and diseases CB2, through judgements based on CB3 data). To understand and apply the principles of Plant Protection, E-CA02). At the same time, the practical knowledge will be evaluated by attendance,

participation and presentation of a small report at the end of each practical section carried out; also the external practices will be evaluated by attendance and the presentation of a report of the developed activities, acquired knowledge, questions raised and resolved, etc. (Capacity to solve problems and capacity of criticism and self-criticism: UAL3 and UAL5). Finally, the final mark will be the result of the average of the two previous groups of evaluations, to which will be added the mark of the work carried out in group. Students who do not obtain a minimum knowledge of the subject, in its theoretical or practical part, will have to take a final, theoretical and/or practical examination of the sections of the subject that they have not passed during the course.

All of the above will be in harmony and/or will be developed in accordance with what is established in Chapter I. Methods of evaluation of the current Regulations for the Evaluation of Student Learning at the University of Almeria (approved by the Governing Council on 7/06/2010; as well as its approved modifications dated 28/07/2010, 31/05/2016 and 20/07/2016.

### **Follow-Up Mechanisms**

- Submission of learning activities.
- Submission of learning activities for lab work
- Attendance and participation in classroom activities
- Tests evaluation

## **COURSE MATERIALS**

### **Recommended course materials**

#### *Basic*

- NIETO-NAFRIAS, J.M.; MIER-DURANTE, M.P. Tratado en Entomología. Ediciones Omega. 1985.
- CABELLO, T.; TORRES, M.; BARRANCO, P. Plagas de los cultivos: Guía de identificación. Universidad de Almeria. 1997.
- Sociedad Española de Fitopatología. Patología Vegetal. Phytoma España. 2000.
- Agrios G.N. Fitopatologia. Limusa S.A. 1996.

#### *Complementary*

- Jacas, J.; Urbaneja, A. Control biológico de plagas. Phytoma España. 2009.
- GULLAN, P.J.; CRANSTON, P.S. The insects: An outline of Entomology. John Willey & Sons. 2014.
- Jiménez-Díaz, R.M.; Montesinos-Seguí, E. Enfermedades de las plantas causadas por hongos y oomicetos. Phytoma España. 2010.
- Melgarejo-Nárdiz, P.; García-Jiménez, J.; Jisdá-Gutiérrez, M.C.; López-González, M.M. et al. Patógenos de plantas descritos en España. Ministerio de Medio Ambiente y Medio Rural y Marino. 2010.
- Gillott, C. Entomology. Springer. 2005.

### **Course materials available in UAL's library**

The current bibliography can be found in the UAL library at the following address:

<http://almirez.ual.es/search/x?SEARCH=25154350>

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## WEBSITE

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- <https://www.juntadeandalucia.es/agriculturapescayderollorural/raif>  
*Junta de Andalucía: Red de alerta e información fitosanitaria*
  - <http://www.aepla.es/>  
*Asociación Empresarial para la Protección de las Plantas (AEPLA)*
  - <https://www.juntadeandalucia.es/organismos/agriculturaganaderiapescaydesarrollosostenible/areas/agricultura/sanidadvegetal/paginas/produccion-integrada-atrias.html>  
*Junta de Andalucía: Producción Integrada y ATRIAS*
  - <https://www.mapa.gob.es/es/agricultura/temas/sanidad-vegetal/productos-fitosanitarios/registro/menu.asp>  
*Ministerio de Agricultura, Pesca y Alimentación: Registro de productos fitosanitarios*
  - <http://www.iobc-global.org/>  
*Organización Internacional de Lucha Biológica (IOBC-Global Home)*
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