

COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE		
LEVEL OF STUDIES	Undergraduate [Free Elective]		
COURSE CODE	1850	SEMESTER	8 th
COURSE TITLE	PHYTOPATHOLOGY		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		WEEKLY TEACHING HOURS	CREDITS (ECTS)
Lectures and Laboratory Exercises		3+2	5
Total		5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Scientific area		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS:	No		
COURSE WEBSITE (URL):	http://efp.aua.gr/el/mathima/740		

(2) LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described. Consult Appendix A - Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area - Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B - Guidelines for writing Learning Outcomes This is the basic introductory course on the concepts of plant disease and their causal agents, but also on the understanding of the pathogenesis, epidemiology and management of plant diseases. After successful completion of the course (theory and laboratory), students (from the departments Biotechnology, Agricultural Economics & Rural Development and Natural Resources Management & Agricultural Engineering) should be able (descriptive indicator 6 of the European Qualifications Framework) to: - Describe the concept of plant disease, parasitism and the degree of pathogenicity and development of a disease. - Distinguish between transmissible and non- transmissible diseases and the elements of their expression (symptoms and signs) according to the causal agents (fungi, bacteria, viruses, viroids, phytoplasmas, non-parasitic causes/adverse environmental conditions). - Understand the biology - reproduction of plant pathogens (fungi, bacteria, oomycetes, viruses, viroids, phytoplasmas) and their interaction with plants. - Describe the stages in the development of an infectious disease and the factors that influence the occurrence of an epidemic. - Understand the basic principles of disease management, depending on the pathogen. - Know the basic epidemiology (survival, transmission) and management of representative diseases of cultivated plants. - Acquire skills related to the recognition of symptoms and signs, through stereoscopic and microscopic observation of spores and fruiting bodies of the main plant pathogenic fungi and oomycetes, in order to have the basic knowledge for the identification of infestations on horticultural, ornamental and tree crops and for their treatment. - Have the opportunity to be informed and evaluate cutting-edge issues related to diseases and biology of plant pathogens.
General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

- Decision-making
- Working independently
- Team work
- Production of free, creative and deductive thinking

(3) SYLLABUS

The objective of the course 'Plant Pathology' is to provide students with theoretical and practical knowledge and to get familiarized with plant diseases and their causes, the biology of the main plant pathogens and their interaction with plants, as well as the basic principles of plant disease management.

Theory

- The concept of disease
- Symptoms and signs of plant diseases
- Basic knowledge of phytopathological mycology (morphology, classification, reproduction, pathogenesis, epidemiology and the most important plant pathogenic genera and species of fungi and oomycetes and symptomatology of the diseases they cause)
- Basic knowledge of phytopathological bacteriology (morphology, classification, reproduction, epidemiology and the most important plant pathogenic genera and species of bacteria and the symptomatology of the diseases they cause)
- Basic knowledge of phytoplasmas and spiroplasmas
- Basic knowledge of plant pathological virology (classification, identification, reproduction and transmission of viruses and viruses, symptomatology, pathogenesis, epidemiology and management of viral and viral diseases)
- Non-parasitic diseases
- Mechanisms of plant pathogenesis (enzyme secretion, toxins, hormones) and plant defence (passive and active defence mechanisms, hypersensitivity reaction, induced and acquired systemic resistance)
- Plant innate immune system (mechanisms of pathogen-host recognition, mechanisms of secretion of bacterial effectors, signal transduction and expression of resistance)
- Basic knowledge of plant disease epidemiology (disease tetrahedron, monocyclic & polycyclic diseases)
- Principles and methods of plant disease diagnostics
- Principles and methods of treatment of plant diseases
- Representative diseases of cultivated plants.

Laboratory Exercises

The aim of the practicals is to provide knowledge and familiarize students with the identification of plant diseases and the diagnostic process.

Students are trained in the basic principles to study plant pathogens, stereoscopic and microscopic observation, identification and classification of the main plant pathogenic fungi, oomycetes and bacteria. Students are trained to distinguish and recognize symptoms, signs and causal agents of important plant diseases (powdery mildew, downy mildew, rusts, anthracnose, , wilts etc.). In addition, they carry out bioassays for viruses and viral diseases.

The topics in the form of laboratory exercises are:

- FUNGI: Fungal structures - Reproduction - Classification (macroscopic observation of sclerotia, microscopic observation of common and multicellular mycelium, transverse septum, sporangia, oospores)
- CHROMISTA Genus : Pythiaceae (macroscopic observation of oomycete cultures, microscopic observation of hyphae, zoosporangia, oospores)
- CHROMISTA : Genus : Peronosporaceae (observation of spot symptoms and mycelia on diseased plant samples, microscopic observation of sporangiophores)
- FUNGI: ASCOMYCOTA (observation of symptoms and polystigmia in diseased plant samples, microscopic observation of cleistothecia, asci)

- FUNGI: BASIDIOMYCOTA (observation of pustules and spore masses in diseased plant samples, microscopic observation of teleiospores)
- DEUTEROMYCETES or INCOMPLETE FUNGI Deuteromycetes; Mitosporic fungi; Fungi imperfecti (observation of symptoms and polystigmia in diseased plant samples, microscopic observation of acervuli, conidia and conidiophores)
- PROCARYOTIC DISEASES (observation of tumors and galls in diseased plant samples)

(4) TEACHING and LEARNING METHODS - EVALUATION

TEACHING METHOD <i>Face-to-face, Distance learning, etc.</i>	Face to face, in the Microscopy Rooms and in the Plant Pathology Laboratory (Theory and Laboratory Exercises)	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Computer-based presentations (Use of PowerPoint images and videos). Support of the learning process through access to e-class, on-line databases etc.	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i> <i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i>	Activity	Semester workload
	Lectures	13x3= 39
	Laboratory exercises per student groups	10x2= 20
	Individual study	66
	Course total (25 h of workload per ECTS)	125
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	The evaluation language is Greek II. The grade in theory is 100% derived from the grade of the final written examination, which consists of multiple choice, matching and short development questions. III. The grade in the laboratory is based 100% on the grade of the final written examination which consists of: 1. 1: True/False 2. Positive/False: 1. Identification of plant pathogens 3. Identification of diseases in plant tissues (fresh/from laboratory collection)	

(5) ATTACHED BIBLIOGRAPHY

1. Theory. Phytopathology, E. Tzamos, Athens, 2007.
2. Laboratory: Laboratory Exercises in Phytopathology, by members of the Phytopathology Laboratory.

Relevant scientific journals and books:

Diseases of Fruit-bearing Trees and Grapevines Panagopoulos, Publications Stamoulis, Athens 2007, Diseases of Ornamental plants, Panagopoulos, Publications Stamoulis, Athens 2002, Diseases of Horticultural Crops, H. Panagopoulos, Publications Stamoulis, Athens 1995, Disease and Pest Compendia Series (Published by The American Phytopathological Society).