

COURSE OUTLINE

1. GENERAL

SCHOOL	Agricultural Sciences		
ACADEMIC UNIT	BIOSYSTEMS& AGRICULTURAL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	BAE 905	SEMESTER	9 th
COURSE TITLE	HYDROPONIC AND AEROPONIC FACILITIES		
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	
Lectures	3		
Tutorials	2		
Laboratory	0		
TOTAL	5	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialised general knowledge, Skills Development		
PREREQUISITE COURSES:	There are no prerequisite courses.		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek .-For Erasmus students in English		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/		

2. LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>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</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>At the end of the lectures, the students should know: the basic technological equipment and the basic cultivation practices applied in the various systems and the innovative technologies of crops outside the soil. They will have gained experience and knowledge in the development of modern cutting-edge technologies in the various hydroponic methods of greenhouse crops.</p> <p>They will also have gained experience and knowledge in the development of aeroponic technology that is currently promoted globally, as well as its basic cultivation practices and future applications. Finally, they will have acquired experience and knowledge for the development of aquaponics</p>
<p>General Competences</p> <p><i>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></p>

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i>
At the end of this course the student will have further developed the following general skills: <i>Search, analysis and synthesis of data and information, also using the necessary technologies</i> <i>Adaptation to new situations</i> <i>Decision making</i> <i>Autonomous work</i> <i>Teamwork</i> <i>Generating new research ideas</i> <i>Respect for the natural environment</i> <i>Exercise criticism and self-criticism</i> <i>Promotion of free, creative and inductive thinking</i>	

3. SYLLABUS

1. Hydroponics: Soilless Cultures.
2. Equipment of hydroponic units
3. Composition of nutrient solutions. Fertilizers used in hydroponics. Nutrient solution preparation systems. Rules for preparation of concentrated solutions. Systems for supplying the nutrient solution to plants. Regulation of irrigation.
4. Substrates and channels for growing crops.
5. Hydroponic culture systems: Open hydroponic systems. Closed hydroponic systems.
6. Float systems. N.F.T. Systems, N.G.S. Systems Aquaculture systems.
7. Hydroponic crops of vegetables and flower plants.
8. Aeroponics: Historical review. Fundamentals of Aeroponics.
9. Advantages and Disadvantages.
10. Modern Aeroponic cultivation systems: Low pressure units Commercial systems
11. Vertical aeroponic growing system (vertical aeroponic cultivation).
12. Aeroponic organic cultivation. NASA Aeronautical Systems. Garden Towers.
13. Fully automated aeroponic plant cultivation system. Aeroponic cultivation of vegetables and flower plants.
14. Aquaponics, fish and plant co-culture systems..

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face to face deliveries.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	<ul style="list-style-type: none"> • Use of ICT (power point) in Teaching • Use of ICT (power point) in Laboratory Training • Video presentation • Use of ICT in Communication with students (Learning process support through the electronic platform e-class). 	
TEACHING METHODS	Activity	Semester workload
	Lectures	39

<p><i>The manner and methods of teaching are described in detail.</i></p> <p><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></p> <p><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></p>	Tutorials	26
	Study and literature survey	20
	Exams	10
	Unguided study	30
	Course total	125
<p>STUDENT PERFORMANCE EVALUATION</p> <p><i>Description of the evaluation procedure</i></p> <p><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></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p> <p>1</p>	<p>1. The main assessment criteria focus on understanding and correlating the knowledge that students gain from the course with knowledge from other courses.</p> <p>The evaluation is continuous and dynamic. It mainly includes short project work, solving problems or answering open questions. Exams are conducted orally or in writing or a combination of the two, with or without pre-examination of the key topics of the course, with or without progressions and by other inventive methods, depending on the dynamics and the needs of the audience</p>	

5. RECOMMENDED LITERATURE in Greek

- ☒ Σάββας Δημήτριος, «Καλλιέργειες εκτός εδάφους», Εκδόσεις Αγρότυπος, 2012.
- ☒ Σαλάχας Γεώργιος, «Αεροπονία», σημειώσεις, 2016.
- ☒ .Adams, P., 2002. Nutritional control in hydroponics. In: Savvas, D., Passam, H.C. (eds). Hydroponic Production of Vegetables and Ornamentals. Embryo Publications, Athens, Greece, pp. 211-261.
- ☒ Hassal and Associates Pty Ltd, 2001. Hydroponics as an Agricultural Production System. A report for the Rural Industries Research and Development Corporation. Publication No 01/141 November 2001.

