

## COURSE MODULE OUTLINE

### General information

<b>SCHOOL</b>	School of Science and Technology		
<b>PROGRAM COURSE</b>	Interdisciplinary PSP cultivations under cover-Hydroponics (KYK)		
<b>LEVEL OF STUDY</b>	Postgraduate program-Master of Science (MSc)		
<b>COURSE UNIT CODE</b>	<b>KYK55</b>		Second semester
<b>COURSE TITLE</b>	Stress Physiology		
<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>CREDITS</b>
Weekly workload hours: 21-22 hours x 13 weeks		280	10 ECTS
<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> Compulsory, Optional, Optional mandatory	Compulsory		
<b>PREREQUISITE COURSES:</b>	no		
<b>LANGUAGE OF INSTRUCTION AND EXAMS:</b>	The language of instruction of the programme is Greek		
<b>THE COURSE IS OFFERED TO ERASMUS STUDENTS</b>	no		
<b>COURSE WEBSITE (URL)</b>	<a href="https://www.eap.gr/en/crops-under-cover-hydroponics/topics/#k55">https://www.eap.gr/en/crops-under-cover-hydroponics/topics/#k55</a>  Each module has its own space in the Learning Management System of EAP ( <a href="https://courses.eap.gr/login/index.php">https://courses.eap.gr/login/index.php</a> ), with controlled access (use of code) for students and teaching staff.		

## (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

Upon successful completion of this unit, students will be able to:

- Know the basic concepts and terminology of exercise physiology
- Know the effects of abiotic stress factors (lack of excess water, salinity, extreme temperatures, problematic light regime, CO<sub>2</sub> or O<sub>2</sub> deficiency) on the structure and function of cultivated plants
- Knowledge of the effects of biotic stress factors (pathogens and pests) on the structure and function of crop plants
- Exploit the beneficial effects of stress factors on the production and quality of products
- Be aware of the interactions of greenhouse crops with climate change

### **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?

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|--|--|
| Search for, analysis and synthesis of data and information by the use of appropriate technologies, | Project planning and management  |
| Adapting to new situations   | Respect for diversity and multiculturalism                                       |
| Decision-making  | Environmental awareness  |
| Individual/Independent work  | Social, professional and ethical responsibility and sensitivity to gender issues |
| Group/Team work  | Critical thinking  |
| Working in an international environment  | Development of free, creative and inductive thinking                             |
| Working in an interdisciplinary environment (Other.....citizenship, spiritual freedom, social      | .....  |
| Introduction of innovative research  | awareness, altruism etc.) .....  |

- Acquire of the background knowledge in order to deal with applied subjects.
- Search for, analysis and synthesis of data and information by the use of appropriate technologies
- Individual/Independent work
- Working in an interdisciplinary environment
- Introduction of innovative research
- Environmental awareness

### (3) COURSE CONTENT

The content of this course targets on the knowledge of the structural and functional changes that occur in a cultivated plant when a biotic or abiotic stress factor is introduced in the environment. It includes the following units:

Introduction to the basic structure and functions of plants

Climate change and its possible impacts on agricultural production: the scenarios of global warming and its effects

Accumulation of salts in soil or nutrient solution

Water shortage

Low irradiance

Absence of ultraviolet and the morphogenetic effects

Variations in CO<sub>2</sub> concentration

Insufficient aeration of the soil or nutrient solution

Oxidative stress: The crossroads where undesirable side effects of stresses meet

The chemical arsenal of plants against pathogens and insects

The defence mechanisms of plants against pathogens and insects

The potential use of the mild stress application to the improvement of greenhouse production

### (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>	<ul style="list-style-type: none"> <li>distance learning using the HOU's E-Learning Platform and conducting Group Consultative Meetings (tele-GCM).</li> </ul>	
<p><b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</b> <i>Use of ICT in teaching, Laboratory Education, Communication with students</i></p>	<ul style="list-style-type: none"> <li>Use of ICT in teaching, Communication with students More specifically, we use :</li> <li>Remote meetings tools (webex),</li> <li>Presentation software (e.g. power point),</li> <li>Specialized software in the subjects under study.</li> <li>Additionally, the students use office automation tools, web browsers and e-reader for digital books.</li> </ul>	
<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 style="text-align: center;"><b>Activity/Method</b></p>	
	<p>3 meetings (4hrs)</p>	<p style="text-align: center;"><b>Semester workload</b></p> <p>12 hrs</p>
	<p>2 educational activities</p>	<p>30 hrs</p>
	<p>1 written assignment (semester essay)</p>	<p>60 hrs</p>
	<p>Final examinations</p>	<p>3 hrs</p>
	<p>Individual study</p>	<p>168-181 hrs</p>
	<p><b>Total course work load</b></p>	<p>273-286 hrs</p>

<p><i>The study hours for each learning activity as well as the hours of selfdirected study are given following the principles of the ECTS.</i></p>	
<p align="center"><b>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS</b></p> <p><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>	<ul style="list-style-type: none"> <li>• a1. Two (2) Short Written Essays, with weighting factor to the class unit's final grade 10% each.</li> <li>• a2. One (1) Semester Essay with weighting factor to the class unit's final grade 20%.</li> <li>• a3 The right to participate in the final exams is secured if there is at least 50% of the sum of what is potentially excellent from all the essays collected and graded, that is 20 units overall out of 100, according to the weighting factors referred to in points a1 and a2.</li> <li>• a4. The grade of the written assignments (short and semester) is activated only with a grade equal to, or above the base (<math>\geq 5</math>) in the final or repeated exams.</li> <li>• All criteria are posted in each module's webpage, as well as in the programme's general page.</li> <li>• The final examination includes a multiple choice sheet, as well as oral examination and accounts for 60% of the total grade.</li> </ul> <p>There are all the criteria posted, both in each written assignment (in the study) and in the general regulation:  <a href="https://www.eap.gr/wp-content/uploads/2022/03/kanonismos-spoudwn-isxys-apo-to-didaktiko-etos-2022-2023.pdf">https://www.eap.gr/wp-content/uploads/2022/03/kanonismos-spoudwn-isxys-apo-to-didaktiko-etos-2022-2023.pdf</a></p>

## (5) SUGGESTED BIBLIOGRAPHY:

<p><b>-Suggested bibliography</b>  Karabourniotis, G., &amp; Savvas, D. (2021). Stress factors affecting glasshouse cultivated plants [Postgraduate textbook]. Kallipos, Open Academic Editions. (in greek)  <a href="http://dx.doi.org/10.57713/kallipos-12">http://dx.doi.org/10.57713/kallipos-12</a></p> <p><b>Optional:</b>  Karabourniotis G. (Ed.). 2012. Stress Physiology of Plants. Embryo Publications. Athens (in greek).  Karabourniotis G. (Ed.). 2013. Functional Plant Anatomy. Embryo Publications. Athens (in greek)  Karabourniotis G. (Ed.). 2016. Plant Physiology. Embryo Publications. Athens (in greek)</p> <p><b>-Related scientific Journals</b>  Environmental and Experimental Botany  Plant Cell and Environment  Journal of Arid Environments  Plant and Soil  Plant Stress  Journal of Plant Nutrition  Journal of Plant Nutrition and Soil Science  Journal of Experimental Botany  Agronomy Journal  Scientia Horticulturae  Acta Horticultura  Frontiers in Plant Science  Journal of the Science of Food in Agriculture</p>
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