COURSE MODULE OUTLINE

General information

SCHOOL	School of Science and Technology		
PROGRAM COURSE	Interdisciplinary PSP cultivations under cover-Hydroponics (KYK)		
LEVEL OF STUDY	Postgraduate program-Master of Science (MSc)		
COURSE UNIT CODE	**KYK53**		Second semester
COURSE TITLE	Construction and Equipment of Crops under Cover		
INDEPENDENT TEACHING ACTIVITIES *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*		**WEEKLY TEACHNG HOURS**	**CREDITS**
Weekly workload hours: 21-22 hours x 13 weeks		280	10 ECTS
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4			
COURSE TYPE Compulsory, Optional, Optional mandatory	Compulsory		
PREREQUISITE COURSES:	no		
LANGUAGE OF INSTRUCTION AND EXAMS:	The language of instruction of the programme is Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	no		
COURSE WEBSITE (URL)	https://www.eap.gr/en/crops-under-cover-hydroponics/topics/#k53 Each module has its own space in the Learning Management System of EAP (https://courses.eap.gr/login/index.php), 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:

- Understand the basic and critical characteristics of the materials used for the construction of the frame of different types of greenhouses and net greenhouses.
- Analyse the individual design steps of a greenhouse and/or net greenhouse
- Dimension the heating, ventilation, cooling, CO2 enrichment systems of greenhouses and the irrigation systems of greenhouses and net greenhouses.
- Use energy-saving techniques and technologies and use renewable energy sources.

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
……
(Other…….citizenship, spiritual freedom, social 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 aim of the Unit is to provide students with specialized knowledge on the design and equipment of greenhouses and net greenhouses, with particular emphasis on the types and materials of construction of greenhouses and net greenhouses and on the techniques of dimensioning the microclimate control systems of greenhouses and the irrigation network of greenhouses and net greenhouses. It includes the following units:

- Types, materials, technical specifications of greenhouses and screenhouses
- Greenhouse heating (Heating needs, Heating systems)
- Greenhouse ventilation (Natural, Dynamic)
- Greenhouse cooling (Psychrometrics, Fan and pad Cooling system, Fog system)
- Greenhouse enrichment with CO_2
- Energy saving and use of renewable energy sources
- Irrigation of greenhouses and screenhouses
- Enclosed plant factories

(4) TEACHING METHODS--ASSESSMENT

<table>
<tr><td>MODES OF DELIVERY
Face-to-face, in-class lecturing, distance teaching and distance learning etc.</td><td colspan="2">• Distance learning using the HOU's E-Learning Platform and conducting Group Consultative Meetings (tele-GCM).</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Use of ICT in teaching, Laboratory Education, Communication with students</td><td colspan="2">• Use of ICT in teaching, Communication with students
More specifically, we use :
• Remote meetings tools (webex),
• Presentation software (e.g. power point),
• Specialized software in the subjects under study.
• Additionally, the students use office automation tools, web browsers and e-reader for digital books.</td></tr>
<tr><td rowspan="5">COURSE DESIGN
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.

The study hours for each learning activity as well as the hours of selfdirected study are given following</td><td>Activity/Method</td><td>Semester workload</td></tr>
<tr><td>3 meetings (4hrs)</td><td>12 hrs</td></tr>
<tr><td>2 educational activities</td><td>30 hrs</td></tr>
<tr><td>1 written assignment (semester essay)</td><td>60 hrs</td></tr>
<tr><td>Final examinations</td><td>3 hrs</td></tr>
<tr><td>Individual study</td><td>168-181 hrs</td></tr>
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the principles of the ECTS.	**Total course work load** | 273-286 hrs
STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *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.* *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.*	• a1. Two (2) Short Written Essays, with weighting factor to the class unit's final grade 10% each. • a2. One (1) Semester Essay with weighting factor to the class unit's final grade 20%. • 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. • a4. The grade of the written assignments (short and semester) is activated only with a grade equal to, or above the base (≥5) in the final or repeated exams. • All criteria are posted in each module's webpage, as well as in the programme's general page. • The final examination includes a multiple choice sheet, as well as oral examination and accounts for 60% of the total grade. There are all the criteria posted, both in each written assignment (in the study) and in the general regulation: https://www.eap.gr/wp-content/uploads/2022/03/kanonismos-spoudwn-isxys-apo-to-didaktiko-etos-2022-2023.pdf

(5) SUGGESTED BIBLIOGRAPHY:

-Suggested bibliography

- Baudoin, W., Nono-Womdim, R., Lutaladio, N., Hodder, A., Castilla, N., Leonardi, C., De Pascale, S., Qaryouti, M. (Eds), 2013. Good Agricultural Practices (GAPs) for Greenhouse Vegetable Crops. Principles for the Mediterranean Climate Areas. FAO plant production and protection paper 217, Rome: FAO, pp. 640, e-ISBN 978-92-5-107650-7

- Kitta E. & Katsoulas N. (2021). Consruction and Equipment of Crops under Cover. Educational material HOU. (in greek, available in: https://courses.eap.gr/mod/folder/view.php?id=90255).
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- Stanghellini, C., Ooster van' t, B., Heuvelink, E., (επιστ. επιμ., Νικ. Κατσούλας). (2019). Greenhouses. Technologies for optimal crop production. Athens: Pedio, ISBN: 978-960-635-089-4, pp. 400 (in greek).

Optional:

- Baudoin, W., Nersisyan, A., Shamilov, A. , Hodder, A., Gutierrez, D., Pascale, S. de, Nicola, S., Gruda, N., Urban, L., Tany, J. (Eds), 2017. Good agricultural practices for greenhouse vegetable production in the South East European countries: principles for sustainable intensification of smallholder farms. FAO Plant Production and Protection Paper 2017, No.230, pp.449 pp. (available in https://www.fao.org/3/i6787e/i6787e.pdf).

- Kitta E., 2014. Physiological and Agronomic Behavior of Horticultural Crops in Screenhouses under Mediterranean conditions. PhD thesis, Polytechnic University Cartagena, Department of Food Engineering and Agricultural Equipment (Spain).

- Ministry of Rural Development and Food, 2020. Technical Specifications of Greenhouses. FEK 5432/B'/09.12.20 (in greek).

-Related scientific Journals

- Biosystems Engineering
- Transactions of the ASABE
- Energy and Buildings
- Applied Energy in Agriculture

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