COURSE OUTLINE

1. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF AGRICULTURE		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	AGRI EX2	**SEMESTER OF STUDIES**	7th or 9th
COURSE TITLE	PLANT PROPAGATION		
FACULTY MEMBER	ELENI KALORIZOU		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	2	
Lab Practice	2	
Total	4	5

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialized general knowledge
PREREQUISITE COURSES:	Typically, there are no prerequisite courses
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (English)
COURSE WEBPAGE (URL)	

2. LEARNING OUTCOMES

Learning outcomes

• 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

The plant propagation course aims to train students on entrepreneurial plant propagation and on know-how development for plant sexual and asexual propagation. Lectures and lab work are focused on technology, facilities requirements, operational management and techniques on plant propagation of fruit trees, ornamentals, vegetables, Vitis spp. and other plant species.

By the end of this course the student will have developed the following skills:

- Design and management of propagation plant facility.
- Optimize and/or choose the best technique to propagate plant species, based on specific plant material physiological requirements.
- Know the factors which contribute to a successful plant propagation.
- Be able to control environmental factors in order to secure plant propagation and development of new plants.

- Be able to recognize the physiological and anatomical changes of plants while sexual and asexual propagation takes place.
- Be able to evaluate qualitative characteristics of plant propagation process and genotypic/phenotypic stability of mother cultures and newly produced plant material.
- Know the ways to conservate plant produced material.

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?

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

- Autonomous (Independent) work
- Team work
- Project planning and management
- Respect for the environment
- Adaptation to environmental changes under optimum, suboptimum and extreme conditions.
- Production of new research ideas
- Promotion of free, creative and inductive thinking

3. SYLLABUS

Lectures

1. Introduction to plant propagation technology. Design and management of plant propagation facilities. Regulatory process to import plant propagation material from European Union and non-EU countries. Quality assurance and genetic ID of plant propagated material.
2. Seed formation and morphology. Development and formation of female and male gametophyte, fertilization, incompatibility, apomixis and seed maturity index.
3. Seed germination mechanism. Seed dormancy and seed viability. Applied techniques for seed dormancy and germination control.
4. Seed production for self-fertile and self-sterile plant species.
5. Quality assurance and seed certification. Genetic purity checks, germination and growth checks, varietal identification. Seed coating technology.
6. Layering and cutting plant propagation. Physiology and anatomy of adventitious roots; factors which affect root formation.
7. Techniques for layering and cutting plant propagation. Techniques using root growth regulators. Qualitative and genetic fidelity checks.
8. Plant grafting. Success factors, incompatibility, rootstocks, relations scion/rootstock.
9. Plant grafting techniques. Budding and grafting.
10. Plant tissue culture. Facilities and technology requirements. Operational management, nutritive solutions, in/out facility phytosanitary requirements and regimes.
11. Plant tissue culture. Processes, environmental control per stage, explants hardening.
12. Specialized techniques for plant tissue culture, micrografting.
13. Tuber and bulb upscale production. Physiology and mechanism of bulb / tuber formation. Anatomical changes, factors affecting formation. Characterization of mature scaling, harvest and postharvest conditioning.

Laboratory exercises

1. Breaking seed dormancy techniques
2. Seed quality control
3. Cutting plant propagation
4. Layering plant propagation
5. Plant budding and grafting
6. Plant tissue culture

4. TEACHING AND LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face lectures in the classroom and laboratory.
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES ***Use of ICT in teaching, laboratory education, communication with students***	Use of Information and Communication Technologies (ICTs) in teaching. Scenarios *in silico* and evaluation of plant propagation data will be integrated in the course. Exemplary solutions will be provided.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *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.* *The student's study hours for each learning activity are given as well as the hours of nondirected study according to the principles of the ECTS*	

Activity	***Semester workload***
Lectures (2 conduct hours per week x 13 weeks)	26
Lab Practice (2 conduct hour per week x 6 weeks)	12
Individual and group lab reports	8
Hours for private study of the student, preparation and attendance mid-term or/and final examinations.	79
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***125 hours (total student work-load)***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *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* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Student performance evaluation will be explained to the students at the beginning of the course/beginning of the semester. 1. Mandatory final written examination for lectures / theoretical part of the course, comprises 60% of the final mark of the student. 2. Mandatory final written examination for the transferred laboratory skills of the course, comprises 40% of the final mark of the student. Minimum pass mark: 5 (full scale: 0-10) 1. The above mentioned process will be taking place in Greek and for foreign students (eg ERASMUS students) in English.

	Examination will be based on full length questions and / or multiple choice questions. 2. Oral examination could take place if permitted by the legal/regulatory framework under which the student is affiliated (or enrolled) to the department. If permitted, oral examination will take place simultaneously with written exams.

5. ATTACHED BIBLIOGRAPHY

- *Proposed literature* (indicative and not restrictive):

1. Agarwal R. L..(2018). Seed Technology. Oxford & IBH Publishing Company Pvt. Limited, 842p.
2. Hartmann H., Kester D., Davies Jr. F., Geneve R., Plant Propagation: Principles and Practices (9th Edition). Pearson Education, Inc., New York. 1004 p.
3. Καλορίζου Ε. και Παπαχατζής Α., 2008. Παραγωγή πολλαπλασιαστικού υλικού. Εκδόσεις Γραμμικό, Λάρισα.
4. Κίντζιος Σ., 2015. Εισαγωγή στον μικροπολλαπλασιασμό των φυτών. Εκδόσεις Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών, Αθήνα.
5. Ποντίκης Κ. 1994. Πολλαπλασιασμός καρποφόρων δένδρων και θάμνων. Εκδόσεις Σταμούλη, Αθήνα.

- *Proposed research journals for further reading* (indicative and not restrictive):

1. Scientia Horticulturae
2. Acta Horticulturae
3. Tree physiology
4. Plant Physiology and Biochemistry
5. HortScience