COURSE OUTLINE

1. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	CROP SCIENCE		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	CRS_202	**SEMESTER OF STUDIES**	2nd
COURSE TITLE	Plant Morphology and Anatomy		

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*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	
Laboratory exercises	2	
Total	5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Background
PREREQUISITE COURSES:	Typically, there are not prerequisite courses.
TEACHING AND ASSESSMENT LANGUAGE:	Greek, English
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No
COURSE WEBPAGE (URL)	

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*

At the end of this course the student will attain knowledge on Plant Morphology and Anatomy, including a brief outline of the principal cell types, tissue systems, and structures (an introduction to the anatomical and histological structure of vegetative and reproductive plant organs). The student will be able to apply basic knowledge: What is plant tissue, plant morphology and anatomy? All about primary and secondary growth of stems and roots. How different cells and tissue systems are arranged.

At the end of the course the student will be able to apply basic knowledge of morphology and anatomy to other subjects in plant physiology, plant nutrition and have further developed the following skills/competences: 1. Ability to demonstrate knowledge and understanding of essential concepts and principles related to plant growth parameters. 2. Ability to apply such knowledge to the estimation and solution of nutritive problems

and as many other plant growing problems. 4. Ability to get more specific knowledge for professional development.

General Abilities

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
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking

Generally, by the end of this course the students will, furthermore, have develop the following general abilities (from the list above):

Autonomous and Teamwork in an interdisciplinary environment

Promoting free, creative and inductive thinking

Basic and specialized knowledge of the natural world. Generation of new research ideas

Respect for the natural environment

3. SYLLABUS

Plant cell:
1. Plant cell structure and ultrastructure.
2. Plant cell subcellular organelles.
3. Plant Cell categories: Parenchyma, collenchyma, sclerenchyma

Plant tissues:
1. Plan tissues. Meristem and permanent tissues.
2. Epidermal tissue system (cuticle, epidermis, epidermal hairs, root hairs, trichomes and stomata).
3. Complex tissues: xylem
4. Complex tissues: floem.
5. Secretory cells and tissues.

Organizing the plant body:
1. The shoot: primary and secondary structure and development.
2. The root: primary and secondary structure and development.
3. The leaf: primary and secondary structure and development.
4. The flower: the morphology and structure of the flower.
5. Reproduction of plants, (flowerw, fruits, seeds).

The **Laboratory exercises** include experiments and exercises in the laboratory:

1. Plant organs: roots, shoots, leaves, flowers, fruits.
2. The plant cell: core, plastids, dead cell encapsulated.
3. Epidermal tissues (cuticle, epidermis, epidermal hairs, root hairs, trichomes and stomata).
4. Tissues: Peripheral, Parenchymal, Supportive, Conductive Tissue.

5. Primary and secondary growth of: shoot, leaf, root.
6. Reproduction of plants, (flowers, fruits, seeds).

4. TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures in the class and in the laboratory (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Use of Information and Communication Technologies (ICTs) (e.g. powerpoint) in teaching. Direct communication with the students (face to face and by e-mail), Support of the learning process and uploading of the educational material to the electronic platform (e-class): https://eclass.upatras.gr
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 non-directed study according to the principles of the ECTS*	
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.*	The evaluation criteria are presented and analyzed to the students at the beginning of the semester. • Final written theory exam • Final examination of laboratory exercises In case of advances, they participate by 30% in the final score, respectively.

Activity	***Semester workload***
Lectures (3 conduct hours per week x 13 weeks)	39
Laboratory practice, fieldwork (2 conduct hours per week x 13 weeks)	26
Final examination	3
Hours for private study of the student and preparation for mid-term or/and final examination / Final examination	57
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***125 hours (total student work-load)***

5. RECOMMENDED LITERATURE

Καράταγλης Στ., Κωνσταντίνου Μ. (2005) Βοτανική, Μορφολογία – Ανατομία. Εκδόσεις Χάρις

Τσέκος Ι., Ηλίας Η. (2007) Μορφολογία και Ανατομία Φυτών. Εκδοτικός Οίκος Αδελφών Κυριακίδη Α.Ε.

Ψαράς Γ. (2002) Άτλας Ανατομίας Φυτών. Εκδόσεις Σταμούλη

Dickison W.C. (2000) Integrative Plant Anatomy. Academic Press