COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	BIOLOGY		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	BIO_EY04	**SEMESTER**	5
COURSE TITLE	PLANT PHYSIOLOGY		

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 and Laboratory Exercises	6	6
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*	Compulsory
PREREQUISITE COURSES:	The student is strongly recommended to have passed examinations in Plant Morphology and Anatomy as well as Biochemistry.
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/BIO212/

(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 the course the student is expected to have assimilated the basic principles of plant functions, as these are related to the life style of the corresponding organisms, as well as the importance of plants for life on planet Earth.
At the end of the course, especially the laboratory practical, the student is expected to be able for constructive formulation of hypotheses and design of simple, yet reasonable, experiments to test their validity. Furthermore, the student is expected to be able to process (using basic computer programs) and present the experimental results.

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…*
	…….

- Retrieve, analyse and synthesise data and information, with the use of necessary technologies
- Work autonomously
- Work in teams
- Advance free, creative and causative thinking

(3) SYLLABUS

1.Introduction to the nature of plants as discrete organisms. Structural and functional innovations distinguishing plants from their ancestors and the colonization of land. 2.Water relations. Properties of water. Uptake, translocation and loss of water. Driving forces, vessels, pumps and embolisms. Stomata as sensors of environmental stimuli and the mechanisms of stomatal movements. Control of transpiration. Avoidance and tolerance of water stress. Structure and function of phloem. Control mechanisms in solute translocation. 3.Photosynthesis and photoprotection. Light absorption, electron flow and photosynthetic phosphorylation. Dissipation mechanisms of surplus energy and xanthophyll cycle. CO2 assimilation, Rubisco and photorespiration. Photosynthetic variations and CO2 concentrating systems. Environmental issues and climatic change. 4.Mineral nutrition. Macro-and micro-nutrients. Availability, uptake and translocation. Structure and function of roots. Symbioses with fungi and bacteria facilitating nutrient harvest. Toxic and salty soils. 5.Growth and development. Hormonal control, gene regulation and environmental tuning. Perception and evaluation of external signals and corresponding change in behavior. Light as environmental information. Photoreceptors. Endogenous rhythms, biological clocks and measurement of time. Gravity as signal. Control of flowering, fruit ripening, leaf abscission, dormancy and death. 6.Plant-microbe interrelationships. Symbiosis and parasitism. Recognition of hosts and pathogens through chemical communication. Resistance mechanisms. Induced resistance and hypersensitive reactions.
Methodology and Implementation of the teaching and pedagogical approach in Plant Physiology.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Lectures in classroom
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Lectures using contemporary methods and attempts of improving critical reasoning through dialogue. Compulsory practicals. Complementary usage of the e-class (open class) platform .
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*	

Activity	***Semester workload***
Lectures	39
Laboratory Exercises	30
Reports of Laboratory Exercises	30
Autonomous study	51
Course total	***150***

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.*	Compulsory written examination in both theory and laboratory practical. In addition, during laboratory practical the students (working in groups of three) process the experimental results and present them voluntarily in audience.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Plant Physiology I. Ridge (ed., English edition). Y. Manetas (ed., Greek edition). ION publishing group, 2005 (in greek).

Plant Physiology K.A. Roubelakis-Angelakis (ed.). Crete University Press, 2003 (in greek).

Plant Physiology (L. Taiz and E. Zeiger, 5th edition). C.A., Thanos (ed., Greek edition). Utopia Publishing, Athens, 2012 (in greek).

Plant Physiology, George Ibalakis, George Karabourniotis, George Liakopoulos, Embryo

Press, 2016 (in greek)

Plant Physiology and Development, L. Taiz and E. ZeigerUtopia Publishing, Athens, 2017 (in greek).

- *Related academic journals:*