**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | School of Health Sciences |
| **ACADEMIC UNIT** | Department of Biological Applications and Technology  |
| **LEVEL OF STUDIES** | Undergraduate |
| **COURSE CODE** | **ΒΕΥ401** | **SEMESTER** | **4th** |
| **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 |
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| *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* | Special background |
| **PREREQUISITE COURSES:** |  |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes (only in Greek) |
| **COURSE WEBSITE (URL)** | http://ecourse.uoi.gr/enrol/index.php?id=688 |

1. **LEARNING OUTCOMES**

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| **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*
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| Plant physiology concerns the way plants function and their interactions with different environments in which they grow. Upon successful completion of the course, the student will be able to:* know the basic functions of plants (photosynthesis, aquatic relations, inorganic nutrition, growth and development, interactions with the environment)
* have a perception of plant particularity as the only organisms that convert solar energy into forms that can be used by other organisms on the planet
* Know how plant functions are coordinated within very different environments in which they grow

be familiar with the theoretical principles underpinning key practical applications (e.g. in agriculture) and be able to assess the usefulness and the risks that may arise from them |
| **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* *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**……**Others…**…….* |
| Autonomous workTeamworkWorking in an interdisciplinary environmentProducing new research ideasRespect for the natural environment |

1. **SYLLABUS**

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| **A. Theory**1. **Photosynthesis:** Photosynthetic light reactions. Carbon fixation: the C3 cycle. The C2 cycle. Carbon dioxide concentrating systems. The physiology of photosynthesis. Photosynthesis and global climate change.
2. **Water and Transport in Plants:** The pathway of water movement. Water potential and the direction of water movement. Water flow in soil and xylem. Transpiration and stomatal control. Surviving water shortage. Phloem structure and function. The mechanism and control of phloem transport.
3. **Plant mineral nutrition:** Mineral nutrient uptake. Availability of ions. Regulation of internal concentrations of mineral nutrients. Nutrient foraging. Toxic soils. Crop development.
4. **Plant growth and development:** Embryogenesis, seed formation and germination. Plant growth regulators and plant development. Seedling development. Phototropism and auxin. Flowering and flower development. Fruit ripening, abscission and senescence.
5. **Interactions between seed plants and microbes:** Four dimensions of an interaction. Case studies. Plant-microbe interactions. Pathogenesis, virulence and resistance. Defense mechanisms in seed plants. Recognition and response. Mycorrhizas in the community.

**Β. LABORATORY EXERCISES**1. Photosynthetic pigments
2. Photosynthetic electron flow
3. Water relations
4. Transpiration
5. Seed germination
6. Inorganic nutrition
7. Phytohormones
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1. **TEACHING and LEARNING METHODS - EVALUATION**

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| **DELIVERY***Face-to-face, Distance learning, etc.* | In class and laboratory, face to face. |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** *Use of ICT in teaching, laboratory education, communication with students* | * Use of PowerPoint presentations in lectures
* Support of teaching/learning process through the electronic platform e-class
* Communication with students through e-mail and through the platform e-class
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| **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* |

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| ***Activity*** | ***Semester workload*** |
| Lectures | 39 |
| Laboratory exercises | 21 |
| Laboratory report | 21 |
| Self-study | 85 |
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| Course total  | ***166*** |

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| **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.* | * Written examination of theory (70%) that includes multiple choice questions and full questions.
* Laboratory reports for each laboratory exercise (30%).
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1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:** Φυσιολογία Φυτών, Taiz Lincoln, Zeiger Eduardo, Εκδόσεις UTOPIA, ISBN: 978-960-98123-9-9.
* Φυσιολογία Φυτών, ΡΟΥΜΠΕΛΑΚΗ-ΑΓΓΕΛΑΚΗ ΚΑΛΛΙΟΠΗ, Εκδόσεις ΙΔΡΥΜΑ ΤΕΧΝΟΛΟΓΙΑΣ & ΕΡΕΥΝΑΣ-ΠΑΝΕΠΙΣΤΗΜΙΑΚΕΣ ΕΚΔΟΣΕΙΣ ΚΡΗΤΗΣ, ISBN: 978-960-524-168-1.

*- Related academic journals:** Plant Physiology
* Plant Physiology and Biochemistry
* Photosynthetica
* The New Phytologist
* Functional Plant Biology
* Journal of Experimental Botany
* Environmental and Experimental Botany
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