**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | Health Sciences | | | | |
| **ACADEMIC UNIT** | Department of Biological Applications and Technology | | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | | |
| **COURSE CODE** | ΒΕΕ903 | **SEMESTER** | | **6th – 8th** | |
| **COURSE TITLE** | Ecophysiology of Mediterranean Plants | | | | |
| **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** |
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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* | Specialised general knowledge  Skills Development | | | | |
| **PREREQUISITE COURSES:** |  | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes | | | | |
| **COURSE WEBSITE (URL)** |  | | | | |

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* | |
| Ecophysiology is the field of plant biology that deals with the study of the interactions of the overall plant performance with environmental parameters, as well as the response and adaptations of the plants under situations of stress, as water deficit or extreme temperatures.  The aim of the course if the introduction of the students to plant ecophysiology and the methodology for the performance of an ecophysiological research in the field and the laboratory. The course is focused on the Mediterranean plants because the Mediterranean climate is the dominant climate type of Greece, as well as the Mediterranean plants, due to the special conditions of the Mediterranean climate, have developed plenty of morphological and physiological adaptations, the study of whom are very interesting. | |
| **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…*  *…….* |
| 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  Respect for the natural environment | |

1. **SYLLABUS**

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| **1st section**   * + - 1. General introduction – Analysis of basic terminology       2. The Mediterranean climate   2.1 Mediterranean type vegetation  2.2 Factors of the climate differentiation  2.3 Relationships of the Mediterranean climate with other climates  2.4 Types of Mediterranean climate   * + - 1. Origins of the plants and the climate   3.1 The development of the Mediterranean climate  3.2 The development of the drought resistant plants  **2nd section**   1. Biodiversity   1.1 The meaning of biodiversity  1.2 Levels of biodiversity  1.3 Biodiversity and ecosystem function  1.4 The biodiversity of the Mediterranean basin   1. Endemism   2.1 The meaning of endemism  2.2 Factors of endemism differentiations  2.3 Endemism in Mediterranean basin   1. Species extinction   3.1 Extinction and pseudo-extinction  3.2 Contemporary extinction rate   1. Biological invasions   4.1 Factors of biological invasions  4.2 Effects of biological invasion on ecosystem function  4.3 Biological invasion in the Mediterranean basin  **3rd section**   1. Climate and vegetation of Mediterranean ecosystems   1.1 Mediterranean plant types  1.2 Evergreen schlerophylls  1.3 Semi-deciduous  1.4 Grasses  1.5 Geophytes  1.6 Forest species  **4th section**  Stresses – responses - adaptations   1. Water    1. Drought and its impacts    2. Responses and survival of Mediterranean species during drought 2. Light    1. Photoprotective mechanisms    2. Carotenoids and the xanthophylls cycle    3. Enzymatic protective systems    4. Photoinhibition   **5th section**   1. Nutrients    1. The case of Mediterranean basin    2. Strategies of nutrient absorption    3. Increase of nutrient absorption    4. Nutrient conservation 2. Decomposition    1. Production of decomposable material    2. Rate of decomposition    3. Effect of climatic parameters   **6th section**   1. Plant – animal interactions    1. The effect of grazing    2. Schlerophylly and grazing    3. Nutritional value of the schlerophylls    4. Defensive tactics and adaptations 2. Fire    1. The fire at Mediterranean ecosystems    2. Regeneration after fire    3. Post-fire ecological succession    4. Ecophysiological impacts of fire on plants   Field and laboratory exercises  **1st exercise**  Training on the methodology, software and equipment that will be used for the exercises.  **2nd exercise**  Ecophysiological analysis of a schlerophyll species (*Quercus ilex*)  **3rd exercise**  Ecophysiological analysis of a semi-deciduous species (*Phlomis fruticosa*)  **4th exercise**  Ecophysiological analysis of a grass (*Malva sylvestris*)  **5th exercise**  Ecophysiological analysis of a deciduous species (*Quercus robur*)  **6th exercise**  Presentation of the final results, as a comparative analysis of the different studied species that belong to different functional groups. |

1. **TEACHING and LEARNING METHODS - EVALUATION**

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| **DELIVERY** *Face-to-face, Distance learning, etc.* | The courses will be held in the class.  The exercises are going to be held in the field and laboratory. |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** *Use of ICT in teaching, laboratory education, communication with students* | * Powerpoint presentations * Software for modelling and data analysis and presentation. |
| **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*** | | Courses | 40 | | Exercises | 40 | | Final study | 20 | |  |  | |  |  | |  |  | | Course total | ***100*** | |
| **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 will based on the final exam (60%) and the final study (40%). |

1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:*  Γεωργίου Κ., Θάνος Κ., Ριζοπούλου Σ., Μελετίου-Χρήστου Μ.Σ. 2012. Οικοφυσιολογία Φυτών. Εκδόσεις Δίαυλος. Αθήνα.  Καραμπουρνιώτης Γ., Λιακόπουλος Γ., Νικολόπουλος Δ. 2012. Φυσιολογία Καταπονήσεων των Φυτών. Εκδόσεις Έμβρυο. Αθήνα.  Καραμπουρνιώτης Γ., Λιακόπουλος Γ. 2009. Οικοφυσιολογία Μεσογειακών Φυτικών Ειδών. Γεωπονικό Πανεπιστήμιο Αθηνών. Αθήνα.  Λεβίζου Ε., Κυπαρίσσης Α. 2008. Οικοφυσιολογία Μεσογειακών Φυτών. Εκδόσεις Πανεπιστημίου Ιωαννίνων. Ιωάννινα.  Lambers H., Chapin III F.S., PonsT. L. 2008. Plant Physiological Ecology. Springer-Verlag New York.  *- Related academic journals:*  Botany  Functional Plant Biology  Plant, Cell and Environment  Plant Physiology  Tree Physiology |