

COURSE OUTLINE

(1) GENERAL

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| SCHOOL | School of Agricultural Sciences | | |
| ACADEMIC UNIT | Biosystems & Agricultural Engineering | | |
| LEVEL OF STUDIES | UNDERGRADUATE | | |
| COURSE CODE | BAE_700 | SEMESTER | 7th |
| COURSE TITLE | SOIL FERTILITY AND FERTILIZERS | | |
| INDEPENDENT TEACHING ACTIVITIES <i>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</i> | WEEKLY TEACHING HOURS | CREDITS | |
| Lectures | 3 | | |
| Tutorials | 0 | | |
| Laboratory | 2 | | |
| TOTAL | 5 | 5 | |
| <i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i> | | | |
| COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i> | Background and Scientific Area | | |
| PREREQUISITE COURSES: | There are no prerequisite courses. | | |
| LANGUAGE OF INSTRUCTION and EXAMINATIONS: | Greek. For Erasmus students in English | | |
| IS THE COURSE OFFERED TO ERASMUS STUDENTS | Yes | | |
| COURSE WEBSITE (URL) | | | |

(2) LEARNING OUTCOMES

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| <p>Learning outcomes</p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i> <p>This course aims to gain an integrated knowledge in soil fertility and fertilizers. It is a continuation of the knowledge acquired by students in the field of soil science, combining the application of fertilizers with the improvement of soil fertility in the context of an effective sustainable management of agroecosystems. Students understand the critical biotic and abiotic factors that affect soil fertility, as well as how to design management measures improving soil fertility. In addition, they acquire basic knowledge about the main categories of fertilizers, their preparation processes, the regulatory framework and the environmental constraints that govern the application of lubricating inputs to soils. Finally, the student integrates the specific knowledge in a broader context of management and protection of agricultural ecosystems.</p> <p>After the completion and the successful examination of the course, students will be able to know:</p> <ul style="list-style-type: none"> • the basic biotic and abiotic factors that determine / affect soil fertility • the sustainable soil fertility management measures • the logic and general objectives of fertilization <p>General Competences</p> <p><i>Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma</i></p> |
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| <i>Supplement and appear below), at which of the following does the course aim?</i> | |
| <i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> | <i>Project planning and management</i> |
| <i>Adapting to new situations</i> | <i>Respect for difference and multiculturalism</i> |
| <i>Decision-making</i> | <i>Respect for the natural environment</i> |
| <i>Working independently</i> | <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> |
| <i>Team work</i> | <i>Criticism and self-criticism</i> |
| <i>Working in an international environment</i> | <i>Production of free, creative and inductive thinking</i> |
| <i>Working in an interdisciplinary environment</i> | <i>.....</i> |
| <i>Production of new research ideas</i> | <i>Others...</i> |
| | <i>.....</i> |

At the end of this course the student will have further developed the following general skills:
 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
 Production of new research ideas
 Respect for the natural environment
 Criticism and self-criticism
 Production of free, creative and inductive thinking

(3) SYLLABUS

1. Nutrients in the soil (macronutrients / trace elements).
 2. Availability of nutrients (biotic and abiotic factors that affect it, mechanisms of uptake by the plant).
 3. Soil microorganisms and fertility. Degradation of organic materials and fertility.
 4. Soil nutrient recycling and sustainability.
 5. Utilization of organic waste
 6. Biological and physicochemical indicators of soil fertility
 7. Relationships between nutrient availability and plant growth / yield.
 8. Introductory concepts for fertilizers (types of fertilizers, properties, etc.).
 9. Basic categories of fertilizers.
 10. Diagnostic criteria of fertilization needs.
 11. Inorganic - Organic fertilization - Foliar fertilization.
 12. Estimation of the required quantities of fertilizers.
 13. Fertilizer uses and regulatory framework.
- Laboratory exercises
- The purpose of the laboratory exercises is to familiarize students with the concepts and methodologies analyzed in the theoretical part. Particularly:
- Sample preparation for soil fertility assessment.
 - Determination of physicochemical properties for soil fertility assesment.
 - Foliar diagnostic - Diagnosis of the Nutritional Status of a Plant.
 - Preparation and calculation of water-soluble fertilizers.
 - Application of fertilizers.
 - Identification of fertilizer units

(4) TEACHING and LEARNING METHODS - EVALUATION

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| DELIVERY <i>Face-to-face, Distance learning, etc.</i> | Lectures in the amphitheatre and laboratory exercises both in the laboratory and in the field. |
| USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY | <ul style="list-style-type: none"> • Use of ICT (power point) in Teaching • Use of ICT (power point) in Laboratory Training |

| Use of ICT in teaching, laboratory education, communication with students | • Use of ICT in Communication with students (Learning process support through the electronic platform e-class). | | | | | | | | | | | | | |
|---|--|-------------------|-------------------|----------|----|------------|----|--|----|--|----|--------------|------------|--|
| <p>TEACHING METHODS</p> <p>The manner and methods of teaching are described in detail.</p> <p>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.</p> <p>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</p> | <table border="1"> <thead> <tr> <th data-bbox="689 264 1027 293">Activity</th> <th data-bbox="1034 264 1364 293">Semester workload</th> </tr> </thead> <tbody> <tr> <td data-bbox="689 302 1027 331">Lectures</td> <td data-bbox="1034 302 1364 331">39</td> </tr> <tr> <td data-bbox="689 340 1027 369">Laboratory</td> <td data-bbox="1034 340 1364 369">20</td> </tr> <tr> <td data-bbox="689 378 1027 454">Writing short reports of laboratory exercises- Exams</td> <td data-bbox="1034 378 1364 454">21</td> </tr> <tr> <td data-bbox="689 463 1027 577">Study hours and preparation for the laboratory exercises and the final examination</td> <td data-bbox="1034 463 1364 577">45</td> </tr> <tr> <td data-bbox="689 586 1027 616">Course total</td> <td data-bbox="1034 586 1364 616">125</td> </tr> </tbody> </table> | Activity | Semester workload | Lectures | 39 | Laboratory | 20 | Writing short reports of laboratory exercises- Exams | 21 | Study hours and preparation for the laboratory exercises and the final examination | 45 | Course total | 125 | |
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| <p>STUDENT PERFORMANCE EVALUATION</p> <p>Description of the evaluation procedure</p> <p>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</p> <p>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</p> | <p>1. The examination in the theory of the course is done with a comprehensive questioner or a multiple-choice questioner that focus on the understanding of the course giving weight to the student's critical ability.</p> <p>3. Oral exams may take place in cases of students who have been exempted from the writing exams and always the same time and day as the writing exams.</p> <p>4. The above are done in the Greek language. For foreign language students (eg Erasmus students) conducted in English</p> | | | | | | | | | | | | | |

(5) ATTACHED BIBLIOGRAPHY (In Greek)

- Suggested bibliography:

- Ιωάννης Θέριος (1996), Ανόργανη θρέψη και λιπάσματα. Εκδόσεις: ΓΑΡΤΑΓΑΝΗΣ ΑΓΙΩΣΑΒΒΑΣ, ISBN: 960-88706-2-3, (in Greek). Κωδικός Βιβλίου στον Εύδοξο: 3558
- Στυλιανίδης Δ.Κ., Σιμώνης Ασ. Δ., Συργιαννίδης Γ. Δ., (2002), Θρέψη, λίπανση φυλλοβόλων οπωροφόρων δέντρων. Εκδόσεις: ΣΤΑΜΟΥΛΗ Α.Ε., ISBN: 978-960-351-377-6 (in Greek). Κωδικός Βιβλίου στον Εύδοξο: 22850
- N.C Brady and R.R. Weil, 2011. Εδαφολογία, η φύση και οι ιδιότητες των εδαφών. 14th edition, απόδοση στα ελληνικά, Εκδ Έμβρυο κεφ. 8 (υποδομής), 12, 13, 14, 15 και 16
- Ιωάννης Ασημακόπουλος. 2014. Λιπάσματα – Λιπάνσεις Εκδ Έμβρυο.
- JL Halvin, SL Tisdale, JD Beaton & WL Nelson Soil Fertility and Fertilizers 8th Edition, Pearson 2014

- Related scientific journals:

- Soils and Fertilizers Abstracts

