COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Agricultural Sciences		
ACADEMIC UNIT	Biosystems & Agricultural Engineering		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**BAE_130**	**SEMESTER**	**1ST**
COURSE TITLE	**INTRODUCTION TO BIOSYSTEMS SCIENCE**		

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	3	
Tutorials	2	
Laboratory	0	
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*	Background
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. Project work
COURSE WEBSITE (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*

The student, at the end of the relevant Learning Process, is able

• to: understand what a system is and how we use this term in Science

• understand the dependence of conclusions about the behavior of a system on the constraints and assumptions on which its definition was based

• understand soil systems, soil composition, life, soil processes and symbiotic interactions

• Be aware of the updated theories of harmonic balance of biosystems.

• Approach each problem as a dynamic system problem.

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
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

Working in an interdisciplinary environment	……
Production of new research ideas	*Others…*
	…….

At the end of this course the student will have further developed the following skills (general skills):

• Ability to demonstrate knowledge and understanding of concepts and applications related to the living and abiotic environment as a whole
• Ability to demonstrate knowledge and understanding of concepts and applications related to the interactions of natural phenomena with biological systems
• Study skills needed for continuing professional development.
• Ability to interact with others in problems of an interdisciplinary nature.

In general, upon completion of this course the student will have further developed the following general skills (from the list above):

Search, analysis and synthesis of data and information, using the necessary technologies
Adaptation to new situations, Decision making, Autonomous and team work,
Respect for the natural environment, Promotion of free, creative and inductive thinking

(3) SYLLABUS

What we define as a system. Conditions and Assumptions. Collaborative action and interdependence of the components of a system. Dynamic systems. The importance of system dynamics. The role of each department and the importance of synergy in the course of its changes. The cell. The organization. Categories of living organisms: Plants, species and categories of plants. Animals, and living organisms in general. Interactions with the abiotic environment. Aquatic systems. Factors affecting the system. Territorial systems. Soil composition, life and processes that take place in the soil. Atmosphere. The dynamics of the atmosphere and its effects. Plants, insects, earthworms and birds. Symbiotic interactions. Human intervention: The differentiation of biosystems due to construction, chemical and biological pollution and noise pollution of new technologies. Nature, human activities, economic reality, the organization of social life and social prosperity as interconnected components of a system. Mathematical simulation of systems. Research and updated theories of harmonic equilibrium of biosystems
Weeks 1 and 2: What we define as a system. Conditions and Assumptions. Collaborative action and interdependence of the components of a system. Dynamic systems. The importance of system dynamics. The role of each department and the importance of synergy in the course of its changes.
Week 3 Introduction to the Holobiont model - from the cell, to the community, to the ecosystem.
Week 4 Aquatic systems. Factors affecting the system
Week 5 Territorial systems. Soil composition, life and processes that take place in the soil
Week 6 Atmosphere. The dynamics of the atmosphere and its effects. Plants, insects, earthworms and birds. Symbiotic interactions.
Week 7 Water and soil utilization / management
Week 8 Land Recovery
Week 9 Introduction to the use of microorganisms for resource recovery

Week 10 Human intervention: The diversification of biosystems due to construction, chemical and biological pollution and noise pollution of new technologies.
Week 11 Biodiversity loss, Deforestation, fragmentation, desertification, ecological and economic dimensions of biodiversity loss
Week 12 Nature, human activities, economic reality, organization of social life and social well-being as interrelated components of a system. Ways and techniques of application of biodiversity conservation in biosystems.
Week 13: Mathematical simulation of systems. Research and updated theories of harmonic equilibrium of biosystems

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Teaching in the amphitheater: Lectures using electronic media which relate to the theory, exercises and applications in the area of Biosystems and Agricultural Engineering.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>• Use of ICT (power point) in Teaching
• Use of ICT (power point) in Laboratory Training
• Use of ICT in Communication with students (Learning process support through the electronic platform e-class).</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39</td></tr>
<tr><td>Tutorials</td><td>26</td></tr>
<tr><td>Projects and exams work</td><td>40</td></tr>
<tr><td>Unguided study</td><td>20</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>125</td></tr>
</table>
</td></tr>
<tr><td>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.</td><td>Written or oral final exam with physical presence or distance with or without participation in work during the semester. Evaluation is dynamic. It mainly involves problem solving. is done orally or in writing or with a combination of the two, with or without pre-examination on the basic principles of the course, with or without exculpatory advances and with other test or inventive methods, depending on the composition of the dynamics and the needs of the audience. performed in the Greek language. For foreign language students (eg Erasmus students) conducted in English
The above are done in the Greek language. For foreign language students (eg Erasmus students) conducted in English</td></tr>
</table>

(5)

(6) ATTACHED BIBLIOGRAPHY

- *Προτεινόμενη Βιβλιογραφία :*

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Sage Publications, pp. 139–158.

3.Modern Theories of Development: An Introduction to Theoretical Biology, Oxford University Press, New York: Harper, 1933

4. Problems of Life: An Evaluation of Modern Biological and Scientific Thought, New York: Harper, 1952.

5. Εισαγωγή στην συστημική μεθοδολογία - ΕΜΠ https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=2ahUKEwjXqZCMpbjjAhUQbq0KHTD-CoAQFjACegQIBBAC&url=https%3A%2F%2Focw.aoc.ntua.gr%2Fmodules%2Fdocument%2Ffile.php%2FMECH121%2F%25CE%2594%25CE%25B9%25CE%25B1%25CF%2586%25CE%25AC%25CE%25BD%25CE%25B5%25CE%25B9%25CE%25B5%25CF%2582%2520%25CE%259C%25CE%25B1%25CE%25B8%25CE%25AE%25CE%25BC%25CE%25B1%25CF%2584%25CE%25BF%25CF%2582%2Fkefalaio8.pdf&usg=AOvVaw3eU3wLA92ytupM5aIm42XE

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- *Τσίγκανος Κανάρης Εισαγωγή στη θεωρητική μηχανική, Έκδοση: 1η έκδ./2004, ΕΚΔΟΣΕΙΣ ΣΤΑΜΟΥΛΗ ΑΕ, ISBN: 978-960-91748-1-7, Κωδικός Βιβλίου στον Εύδοξο: 22744*

Επιπρόσθετη βιβλιογραφία:

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