COURSE OUTLINE

1. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	FOOD SCIENCE AND NUTRITION		
EDUCATION LEVEL	*Undergraduate*		
LECTURE CODE	ΒΠ-113	**SEMESTER**	1st
LECTURE TITLE	Biology Responsible person: Sandra Martín-Peláez		

SELF-ENDED TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDIT UNITS (ECTS)**
LECTURES	3	5
LABORATORY EXERCISES	3	

COURSE TYPE	Scientific Area of Biology
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://food.uth.gr/sandra-martin-pelaez/?lang=en

2. LEARNING OUTCOMES

Learning outcomes

The aim of the Course is to:

- Introduce the fundamental principles of biological organization, from the cellular level to organisms, populations, communities, and ecosystems.
- Provide an understanding of the basic relationships between structure and function in living organisms, with particular emphasis on cellular organization and function.
- Introduce the fundamental concepts of reproduction, heredity, genetic variation, adaptation, and evolution as principles underlying the continuity and diversity of life.
- Provide an overview of the diversity of living organisms and their evolutionary relationships, including microorganisms, fungi, plants, and animals.
- Develop an understanding of the interactions between organisms and their environment and of the biological processes underlying ecosystems and biological resources relevant to food systems.

Upon successful completion of the course, the student will be able to:

- Describe the main characteristics of living organisms and the different levels of biological organization.
- Identify and explain the basic structural and functional characteristics of prokaryotic and eukaryotic cells and relate biological structure to function.
- Explain the fundamental principles of reproduction, cell division, heredity, genetic variation, and evolution, and relate these processes to the continuity and diversity of life.
- Recognize and distinguish the major groups of living organisms and describe their main characteristics and evolutionary relationships.
- Explain basic interactions between organisms and their environment, including relationships within populations, communities, and ecosystems.
- Interpret basic biological observations and data and communicate biological concepts using appropriate scientific terminology.
- Relate fundamental biological principles to organisms and biological processes

relevant to food production and Food Science and Technology.
- Apply basic scientific reasoning to the observation and interpretation of biological structures, processes, and phenomena.

General Skills

1. Search, analysis and synthesis of data and information, also using the necessary technologies.
2. Adaptation to new situations.
3. Decision making.
4. Autonomous work.
5. Group work.
6. Generation of new research ideas.
7. Project planning and management.
8. Exercise criticism and self-criticism
9. Promotion of free, creative and inductive thinking

Course content

Theory

BLOCK I. FUNDAMENTALS OF BIOLOGY AND THE ORGANIZATION OF LIFE

The concept of life and the general characteristics of living organisms. Biology as a science. Levels of biological organization. Basic principles of evolution. Cell theory. General organization of prokaryotic and eukaryotic cells. Major cellular structures and their functions. Structure–function relationships. Biological membranes and the relationship between the cell and its environment. Transport of substances. Cell communication and homeostasis.

BLOCK II. ORGANIZATION, REPRODUCTION, HEREDITY AND EVOLUTION

Organization of multicellular organisms. Cellular differentiation and specialization. Tissues, organs and organ systems. The cell cycle and cell division. Mitosis and meiosis. Sexual and asexual reproduction. Fundamental concepts of genetics and heredity. Genes, alleles, chromosomes and genomes. Genetic variation. Mutations and recombination. Basic principles of evolution. Natural selection, adaptation and speciation. Relationships among heredity, variation and evolution.

BLOCK III. BIOLOGICAL DIVERSITY AND ORGANISMS OF RELEVANCE

Basic principles of classification and systematics. The concept of phylogeny. Major groups of organisms and their evolutionary relationships. Bacteria, archaea, protists, fungi, plants and animals. General characteristics and adaptations of the major groups of organisms. Biodiversity and its importance. Plants, fungi and animals as biological resources. Diversity and functions of microorganisms. Interactions between microorganisms and other organisms. Symbiosis and mutualism. Decomposition and biological transformation. The importance of organisms in production and food systems.

BLOCK IV. ORGANISMS, THE ENVIRONMENT AND FOOD

The concepts of population, community and ecosystem. Biotic and abiotic factors. Interactions among organisms. Food webs and energy flow. Cycling of matter. Biodiversity and ecosystem functioning. Interactions between organisms and agricultural and food systems. Primary production and the transfer of matter and energy. Relationships among biodiversity, food production and sustainability. Human

impacts on biological systems. Biodiversity conservation. Integration of fundamental biological principles in the context of Food Science and Technology.

Laboratory Exercises

The practical activities are designed to support the application and further understanding of the fundamental biological concepts presented in the theoretical component of the course. Through observation, the study of biological material, the use of laboratory techniques, and the analysis of experimental or other biological data, students are introduced to the study of living organisms and fundamental biological processes.

The activities also aim to develop skills in observation, data collection and interpretation, scientific reasoning, and safe laboratory practice. The content of the practical activities is linked to the thematic blocks of the course and is adapted to the educational objectives and requirements of the curriculum.

3. TEACHING AND LEARNING METHODS - ASSESSMENT

<table>
<tr><td>TEACHING METHOD</td><td>Face-to-face lectures in the classroom and face-to-face laboratory exercises in the appropriate laboratory facilities.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</td><td>Use of ICT in Teaching: Lecture presentations using PowerPoint (PPT) and use of a computer by the instructor.
Support of the Learning Process: Support of teaching and provision of educational material through the e-Class platform.</td></tr>
<tr><td>COURSE ORGANIZATION</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>39
(13 weeks x 3 h.)</td></tr>
<tr><td>Laboratory Exercises</td><td>18
(6 × 3 h.)</td></tr>
<tr><td>Independent Study & Course Preparation</td><td>30</td></tr>
<tr><td>Preparation for Written Examinations</td><td>38</td></tr>
<tr><td>Total Course Workload</td><td>125
(5 ECTS)</td></tr>
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<tr><td>STUDENT ASSESSMENT</td><td>The final grade for the course is determined by 70% from the theoretical part and 30% from the laboratory part.

• Theoretical Part Examinations (70%): Include multiple-choice questions and short essay or critical thinking questions.
• Laboratory Part Examinations (30%): Include multiple-choice questions and computational exercises / prblems.

A passing grade (5 out of 10) is required in both the theoretical and the laboratory parts.</td></tr>
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4. SUGGESTED BIBLIOGRAPHY

- Βασικές Αρχές Κυτταρικής Βιολογίας 4η έκδοση, Alberts B., Bray D., Hopkin K., Johnson A., Lewis J., Raff M., Roberts K., Walter P.
- Εισαγωγή στη βιολογία, ΚΑΣΤΡΙΤΣΗΣ ΚΩΝΣΤΑΝΤΙΝΟΣ, ΔΗΜΗΤΡΙΑΔΗΣ ΒΑΣΙΛΕΙΟΣ, ΣΙΒΡΟΠΟΥΛΟΥ ΑΦΡΟΔΙΤΗ
- Βιολογία: Βασικές Έννοιες, E. Simon