



COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	AY104	SEMESTER	1st
COURSE TITLE	BIOLOGY		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Teaching Hours		4	5
COURSE TYPE	General background		
PREREQUISITE COURSES	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_184		

(2) LEARNING OUTCOMES

Learning outcomes
The Biology course provides students with the basic background knowledge necessary for the successful completion of a series of courses in the Department of Environmental Sciences. The course material aims to introduce students to fundamental concepts of Biology and help them understand the basic mechanisms of life. It covers the basic chemical compounds of living organisms, the structure of the cell as the fundamental functional unit of life, the management of chemical compounds and energy, cellular division, heredity, the flow of genetic information, and basic applications of biotechnology. Upon successful completion of the course, students will be able to: • Understand the basic principles and concepts of Biology, mainly regarding the chemical compounds of living organisms, as well as the use and management of energy. • Recognize the cell as the unit of life and understand its structure. • Understand the basic functions of the cell and their connection to the environment. • Understand the mechanisms of energy production in the cell and organisms. • Understand cellular division, heredity, and evolution through natural selection. • Use an optical microscope and other basic laboratory instruments, as well as basic laboratory techniques for the study of biological samples. • Appreciate contemporary issues and applications of Biology. • Apply the knowledge gained in the course to other subjects in subsequent semesters related to Biology, such as Environmental Microbiology, Ecology, Environmental Biotechnology, etc. • Evaluate, analyze, and calculate data from laboratory measurements and write laboratory reports.
General Competences
• Search for analysis and synthesis of data and information with the use of the necessary technology • Decision-making • Working independently • Respect for the natural environment • Criticism and self-criticism • Production of free, creative and inductive thinking

(3) SYLLABUS

<u>Theory:</u> • Introduction: The rules governing the phenomenon of life. • Chemistry of Life (chemical elements, chemical bonds in life, water). • Chemistry of Life (Structure and function of major biological molecules).
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- The cell: Tour of the cell - Cell organelles - Structure and function of membranes.
- Cellular metabolism. Energy flow, biological reactions. Enzymes.
- Respiration. Photosynthesis.
- Cell communication.
- Cell cycle. Mitosis-Meiosis.
- Introduction to Genetics. Mendel and the concept of the gene.
- Chromosomal and molecular basis of heredity.
- From gene to protein.
- Regulation of gene expression.
- Applications of Biology - Genomes and their evolution.

Laboratory Exercises:

- Laboratory safety rules, use of equipment.
- Laboratory calculations in biology. Measurement units. Size of Biomolecules.
- Microscope - Stereoscope - Animal cell - Plant cell - Cell organelles.
- Plasmolysis.
- Cell division.
- Isolation of DNA from cells of the oral cavity.
- Basic Molecular Biology Techniques: Polymerase Chain Reaction (PCR), electrophoresis.

(4) TEACHING and LEARNING METHODS – EVALUATION

DELIVERY	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	• Use of PowerPoint slides • View material in video • Communication with students via e-mail • Use of asynchronous distance learning (e-class)	
TEACHING METHODS	Activity	Semester workload
	Lectures	36
	Seminars	5
	Laboratory practice	8
	Study and analysis of bibliography	47
	Essay writing	26
	Course total (25 hours workload per credit)	125
STUDENT PERFORMANCE EVALUATION	Students' performance is evaluated in the Greek language. The final grade is determined by: • A written examination (at the end of the semester), provided that the laboratory exercises have been completed. • The evaluation of the laboratory practice, which includes: completion of laboratory exercises, submission of a written report for each laboratory exercise, and a written examination. Final Grade = 80% Theory Exam Grade + 20% Laboratory Grade	

(5) ATTACHED BIBLIOGRAPHY

- Solomon, P. Eldra, Martin, E. Charles, Martin, W. Diana, Berg, R. Linda. (2021) *Biology*. Nicosia: Broken Hill Publishers. (in Greek)
- Starr, Cecie, Evers, Christine and Starr, Lisa. (2014) *Biology: Concepts and Applications*. Athens: UTOPIA Publications. (in Greek)
- Urry, Lisa A., Cain, Michael L., Minorsky, Peter V., Wasserman, Steven A. and Orr, Rebecca B. (2023) *Campbell Biology I*. Heraklion: Crete University Press, Foundation for Research and Technology Hellas. (in Greek)