



COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	AY702	SEMESTER	7th
COURSE TITLE	ENVIRONMENTAL BIOTECHNOLOGY		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS		CREDITS
Teaching Hours		5	6
COURSE TYPE	Special Background		
PREREQUISITE COURSES	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_144		

(2) LEARNING OUTCOMES

Learning outcomes
Upon successful completion of the course, students will be able to: <ul style="list-style-type: none">• Understand the basic principles of Environmental Biotechnology and its field of applications.• Exhibit thorough knowledge of the main biotechnological applications of microorganisms in environmental practices, for the restoration of polluted environmental substrates.• Comprehend the usefulness of microorganisms as biological factories for the production of new products, with low environmental footprint, to be used, as well, in the production of biofuels, in agriculture (biological pesticides, mycorrhizae, plant growth promoting rhizobacteria), in the paper industry, the plastics industry, the chemicals industry, metal mining, etc.• Critically evaluate situations and data, design and synthesize plans to solve environmental problems with the use of biotechnology.• Design new biotechnological processes to create products with low environmental footprint.
General Competences
<ul style="list-style-type: none">• Search, analysis and synthesis of data and information using the necessary technologies• Adaptation to new situations• Decision making• Teamwork• Work in an interdisciplinary environment• Generating new research ideas• Project planning and management• Respect for the natural environment

(3) SYLLABUS

<ul style="list-style-type: none">• Climate change and environmental footprint.• Microorganisms.• Genetic diversity – Mutations.• Recombinant DNA technology.• Synthetic Biology.• Genetically Modified Organisms.• Plant Restoration.• Biological preparations.• Energy produce.• Reduction of Energy Consumption.
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- Bioreactors.
- Biological Treatment of Liquid Waste.
- Biological Treatment of Solid Waste.

Laboratory exercises:

Detection of ice-nucleating organisms | *Trichoderma* Cultivation | Galanthus Database | Applications of oregano oil | GMO Detection | Biogas from manure | Applications of biological ice-nucleators | Applications of non-biological ice-nucleators | Experiment for the selection of plants resistant to cold.

(4) TEACHING and LEARNING METHODS – EVALUATION

DELIVERY	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	<ul style="list-style-type: none"> • 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	39
	Laboratory practice	26
	Study and analysis of bibliography	40
	Essay writing	45
	Course total (25 hours workload per credit)	150
STUDENT PERFORMANCE EVALUATION	<p>Students' performance is evaluated in the Greek language. The final grade is determined by:</p> <ul style="list-style-type: none"> • A written exam (at the end of the semester) that contributes 70% to the final grade, applying one or more of the following evaluation methods: Multiple-choice questions, short-answer questions, problem-solving. • Elaboration of an individual or group assignment that contributes 30% to the final grade. <p>Final Grade = 70% Exam Grade + 30% Assignment Grade</p>	

(5) ATTACHED BIBLIOGRAPHY

- Angelis, G., (2017) *Microbiology and Microbial Technology*. Athens: UNIBOOKS-Stamoulis Publications. (in Greek)
- Dougias, Spyridon, Aivazidis, Alexandros, & Melidis, Paraschos (2012) *Environmental Microbiology*. Athens: Embryo Publications. ISBN: 978-960-524-634-1. (in Greek)
- Kyriakidis, A. Dimitrios (2000) *Biotechnology*. Thessaloniki: Ziti Publications. (in Greek)
- Renneberg, Reinhard, Berkling, Viola, Lorocho, Vanya, & Süßbier, Darja (2019), *Biotechnology for beginners*. Nicosia: Broken Hill Publishers Ltd. ISBN: 9789925575381
- Zoumboulis, A. and Matis, K. A. (2010) *Processes in Biotechnology*. Thessaloniki: Tziola Publications. (in Greek)