

COURSE OUTLINE

(1) GENERAL

SCHOOL	APPLIED BIOLOGY & BIOTECHNOLOGY		
ACADEMIC UNIT	BIOTECHNOLOGY		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	3610	SEMESTER	8
COURSE TITLE	Environmental & Marine Biotechnology		
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 (x13 wks)	1,56
Practical Lab Courses		2 (x13 wks)	1,04
Group class presentation (selected topics/ scientific articles)		2,3 (x13 wks)	1,20
Autonomous study (personal assignment)		2,3 (x13 wks)	1,20
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		SUM: 9,6 (x13 wks)	5,0
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Biotechnology		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek (Teaching & Exams)		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	English (Teaching & Exams)		
COURSE WEBSITE (URL)	Under construction		

(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

Upon successful completion of the course, the student will:

- Acquire knowledge of the ecology of organisms in the environment, as well as their contribution to the biogeochemical cycles of nutrients.
- Acquire understanding on how the microorganisms and plant organisms are being used to bio-remediate the degraded environment.
- Acquire knowledge of microbial growth under the adverse effects of polluting environments and how it is affected by them
- Understands metabolism and products produced by microorganisms during waste-streams processing

- Has knowledge of diversity and interactions of microorganisms in soil or water
- Has realized the importance and prospects for the development of marine biotechnology in the Mediterranean countries.

General Competences	
<i>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?</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>
1) Retrieve, analyze and synthesize data and information relying on use of necessary technologies. 2) Adjust to new situations. 3) Decision making. 4) Work autonomously. 5) Work in groups. 6) Create novel scientific projects. 7) Design and develop research projects/experiments. 8) Be critical and self-critical. 9) Apply knowledge to practice.	

(3) SYLLABUS

1) Basic Environmental Microbiology / Classification of microorganism in the environment 2) Microbial diversity / ecology / interactions 3) Environmental genomics, methods of analysis of microbial diversity in the environment. 4) Microbial ecosystems, Microbial symbiosis. 5) Microbiology of the applied environment, nutrient cycles 6) Biochemistry and metabolism of xenobiotic chemicals: Biodegradation of xenobiotics (herbicides, plastics, PHV / PHB, PAH, polychlorinated substances, diphenyls, etc.), Biodegradation of petroleum products 7) Production of high value-added products from waste (fertilizer, animal feed, etc.) 8) Metabolism and interactions of microbial metabolic networks in the marine environment 9) Biotechnology of marine organisms. Industrial production systems and high added value products from micro- and macroalgae. 10) Examples of biotechnological applications of marine organisms, waste treatment, phage therapy applications.
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(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face
<i>Face-to-face, Distance learning, etc.</i>	

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Power point presentations, student contact electronically.	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</i> <i>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</i>	Activity	Semester workload
	Lectures	39 h = 1.56 ECTS (13 wks x 3 h)
	Practical Lab Courses	26 h = 1.04 ECTS (13 wks x 2 h)
	Group Class presentations	30 h = 1.2 ECTS (13 wks x 2,3 h)
	Autonomous study	30 h = 1.2 ECTS (13 wks x 2,3 h)
	Course total	175
		(5 ECTS)
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving,</i>	I) Written final examination (50%) with ranking difficulty on the basis of the issues and subjects presented during theoretical courses. The exams will include: - Questions of multiple choice. - Questions of theoretical knowledge. - Theoretical problems to be resolved. II) Laboratory exercises/ practical courses (30%). Students individually or in groups will provide a written report before the beginning of the next exercise. The grade of lab courses will be based on the writing reports, attendance and class participation. III) Group and small autonomous assignments (20%).	

1. Recommended Literature

1. " BROCK Biology of Microorganisms", Authors: Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckley, David A. Stahl, 2018.

-Relevant Scientific Journals:

Enzyme and Microbial Technology, Bioresource Technology, Journal of Applied Microbiology, Applied Microbiology and biotechnology, Applied and Environmental Microbiology, Microbial Biotechnology