

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF BIOLOGICAL APPLICATIONS AND TECHNOLOGY		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	BEE608	SEMESTER	7 th
COURSE TITLE	AQUATIC MICROBIAL ECOLOGY		
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	
	6	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialised general knowledge Skills Development		
PREREQUISITE COURSES:	Hydrobiology, Microbiology		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in English)		
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=271		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i> 						
<p>The overall aim of the course is to gain an insight on issues regarding the biology (from genes to ecosystems) of aquatic microorganisms. Upon completion of the course students should be able to :</p> <ul style="list-style-type: none"> - outline the major traits of microbial life in aquatic environments - discuss mechanisms that control microorganisms spread and microbial community composition and structure - demonstrate an understanding of the ecology of aquatic microorganisms; the processes carried out by them; their contribution to ecosystem services - describe fundamental approaches for the study of microorganisms and microbial processes in the aquatic environment - formulate scientific hypotheses and design simple experiments for testing them 						
<p>General Competences</p> <p><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></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i></td> <td style="width: 50%; border: none;"><i>Project planning and management</i></td> </tr> <tr> <td style="border: none;"><i>Adapting to new situations</i></td> <td style="border: none;"><i>Respect for difference and multiculturalism</i></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;"><i>Respect for the natural environment</i></td> </tr> </table>	<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>Respect for the natural environment</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>Respect for the natural environment</i>					

<i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i>
Working independently Teamwork Respect for the natural environment and microbial diversity Design and conduct experiments Search for, analysis and synthesis of data and information, with the use of the necessary technology	

(3) SYLLABUS

- Introduction to aquatic microbial ecology and brief history of environmental microbiology. Review of microbial life.
- Elements, biochemicals and structure of microbes
- The effect of nutrients and abiotic parameters on microbial ecophysiology
- Microbial community structure in aquatic environments
- “Omic” approaches for the study of aquatic microorganisms
- Microbial primary production. Degradation of organic matter and carbon flow in microbial food webs
- Microorganisms, climate, and climate change. The role of microbes in the biosphere.
- Microbial growth and grazing
- Ecology of viruses
- Processes in anoxic environments
- The attached-life style: Microbial communities in biofilms and microbial mats.
- Symbiotic relationships among microorganisms and between microorganisms and animals in aquatic habitats.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Classroom	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	University e-course platform Laboratory education Email: aquatic.microorganisms@gmail.com Webpage: http://winobloggers.blogspot.gr/ Platform: www.padlet.com Platforms for data analysis (e.g. https://usegalaxy.org/ , https://blast.ncbi.nlm.nih.gov)	
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	26
	Laboratory practice and essay writing	25
	Field work	12
	Laboratory essays	19
	Tutorials	13
	Essay	28
	Non-directed study	45
	Total	163
STUDENT PERFORMANCE EVALUATION		

<p><i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Multiple choice questionnaires, short-answer questions, open-ended questions 50%</p> <p>Laboratory work and essays/reports 25%</p> <p>Case-study 15%</p> <p>Class participation 10%</p>
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(5) ATTACHED BIBLIOGRAPHY

<p><i>- Suggested bibliography:</i></p> <ul style="list-style-type: none"> • Kirchman DL, Processes in Microbial Ecology. 2018, Oxford edt, ISBN-13: 9780198789406 (in Greek/English) • Kormas K. Ecology of aquatic microorganisms, 2010, Gartaganis edt ISBN: 978-960-6859-14-4 (in greek) • Ντούγιας Σ, Αϊβαζίδης Α, Μελίδης Π, 2012, ΠΕΡΙΒΑΛΛΟΝΤΙΚΗ ΜΙΚΡΟΒΙΟΛΟΓΙΑ, ΕΜΒΡΥΟ ΕΜΠΟΡΙΚΗ ΕΚΔΟΤΙΚΗ ΜΟΝ. ΙΚΕ ISBN: 978-960-8002-66-1 (in Greek) • Madigan T et al. Brock Biology of Microorganisms, 2014, Pearson edt ISBN-13: 978-0321897398 <p><i>- Related academic journals:</i></p> <ul style="list-style-type: none"> • AQUATIC MICROBIAL ECOLOGY • ENVIRONMENTAL MICROBIOLOGY • MICROORGANISMS • JOURNAL OF PLANKTON RESEARCH
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