**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | School of health sciences | | | | |
| **ACADEMIC UNIT** | Department of Biological Applications and Technology | | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | | |
| **COURSE CODE** | ΒΕΕ608 | **SEMESTER** | | 7th | |
| **COURSE TITLE** | Aquatic microorganisms from genes to ecosystems | | | | |
| **INDEPENDENT TEACHING ACTIVITIES** *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* | | | **WEEKLY TEACHING HOURS** | | **CREDITS** |
|  | | | 5 | | 5 |
|  | | |  | |  |
|  | | |  | |  |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | |  | |  |
| **COURSE TYPE**  *general background,  special background, specialised general knowledge, skills development* | 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 | | | | |

1. **LEARNING OUTCOMES**

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| **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* | |
| The overall aim of the course is to gain an insight on issues regarding the biology (from genes to ecosystems) of aquatic microorganisms and their impact on the biosphere. Students should be able to :  - outline the major traits of microbial life in aquatic environments  - describe fundamental approaches for the study of microorganisms and microbial processes in the aquatic environment  - demonstrate an understanding of the ecology of aquatic microorganisms; the processes carried out by them; their contribution to ecosystem services  - formulate scientific hypotheses and design simple experiments for testing them | |
| **General Competences** | |
| *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?* | |
| *Search for, analysis and synthesis of data and information, with the use of the necessary technology*  *Adapting to new situations*  *Decision-making*  *Working independently*  *Team work*  *Working in an international environment*  *Working in an interdisciplinary environment*  *Production of new research ideas* | *Project planning and management*  *Respect for difference and multiculturalism*  *Respect for the natural environment*  *Showing social, professional and ethical responsibility and sensitivity to gender issues*  *Criticism and self-criticism*  *Production of free, creative and inductive thinking*  *……*  *Others…*  *…….* |
| Search for, analysis and synthesis of data and information, with the use of the necessary technology  Working independently  Team work  Respect for the natural environment | |

1. **SYLLABUS**

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| * Introduction to aquatic microbial ecology and brief history of environmental microbiology. Review of microbial life. * Fundamental tools and approaches for the study of aquatic microorganisms. Methodological limitations. * Ecophysiology of aquatic microorganisms. Survival strategies. * Overview of the aquatic microbial metabolism and contribution to ecosystem services. * Microbial distribution/processes in water-column habitats * Microbial distribution/processes in aquatic sediment habitats * Aquatic food webs. The classic food chain, microbial food webs, microbial loop, viral loop, mycoloop. * Ecogenomics and new discoveries in aquatic microbial ecology. * The attached-life style: Microbial communities in biofilms and microbial mats. * Symbiotic relationships among microorganisms and between microorganisms and animals in aquatic habitats. |

1. **TEACHING and LEARNING METHODS - EVALUATION**

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| **DELIVERY** *Face-to-face, Distance learning, etc.* | Classroom |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** *Use of ICT in teaching, laboratory education, communication with students* | University e-course platform  Laboratory education  Email: [aquatic.microorganisms@gmail.com](mailto:aquatic.microorganisms@gmail.com)  Webpage: <http://winobloggers.blogspot.gr/> |
| **TEACHING METHODS**  *The manner and methods of teaching are described in detail.*  *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.*  *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* | |  |  | | --- | --- | | ***Activity*** | ***Semester workload*** | | Lectures | 45 | | Laboratory practice and essay writing | 30 | | Field work | 15 | |  |  | |  |  | |  |  | | Non-directed study | 35 | | Total | ***125*** | |
| **STUDENT PERFORMANCE EVALUATION**  *Description of the evaluation procedure*  *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*  *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Multiple choice questionnaires, short-answer questions, open-ended questions 60%  Laboratory work and essays/reports 40% |

1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:*   * Kormas K. Ecology of aquatic microorganisms, 2010, Gartaganis edt ISBN: 978-960-6859-14-4 (in greek) * Madigan T et al. Brock Biology of Microorganisms, 2014, Pearson edt ISBN-13: 978-0321897398   *- Related academic journals:*   * AQUATIC MICROBIAL ECOLOGY * ENVIRONMENTAL MICROBIOLOGY |