COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	TECHNOLOGY		
DEPARTMENT	ENVIRONMENTAL SCIENCES		
LEVEL OF STUDY	*Undergraduate*		
COURSE UNIT CODE	NEW **COURSE**	**SEMESTER**	8
COURSE TITLE	MOLECULAR ECOLOGY		

INDEPENDENT TEACHING ACTIVITIES in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits	**WEEKLY TEACHNG HOURS**	**CREDITS**
THEORETICAL BACKGROUND	2	3
LABORATORY PRACTICE		
TOTAL	2	3

COURSE TYPE Background knowledge, Scientific expertise, General Knowledge, Skills Development	Scientific Expertise
PREREQUISITE COURSES:	ENVIRONMENTAL MICROBIOLOGY, BIOLOGY, ECOLOGY
LANGUAGE OF INSTRUCTION &EXAMINATION/ASSESSMENT:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	-

(2) LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail.
It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

Upon completion of the course the students are expected to

- *Understand the methodological approaches utilized – who we approach experimentally molecular ecology*
- *Endeavour the current ideas for the evolution of life*
- *To understand how evolution works in molecules and how the molecular clock works*
- *To acknowledge the significant mitochondrial DNA*

- *To understand the role of mutations in evolution and ecology*
- *To understand the large phylogenetic and functional diversity of microorganisms*
- *To get a good understanding of how horizontal gene transfer works including the risk associated with the release of genetically modified organisms*
- *To appreciate how the use of molecular methods enabled the phylogenetic identification of "difficult to characterize" organisms*
- *To understand the application of molecular methods in population ecology, especially relatively to biological conservation.*
- *To appreciate the application of molecular methods in behavior ecology*
- *To appreciate how molecular methods could recover genetic information from fossils samples*
- *To be capable of analyzing critically the results which are presented in scientific journals*

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,
Adapting to new situations
Decision-making
Individual/Independent work
Group/Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for diversity and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical thinking
Development of free, creative and inductive thinking
……
(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)
…….

The teaching methods followed and the course content encourage:

1) The search, analysis and composing of information with the use of relevant technologies
2) Adjustment to new and changing situations
3) Individual working
4) Group working
5) Working in an international and multidisciplinary environment with final aim to resolve problems
6) Production of novel research ideas
7) Planning and management of constructions
8) Respect to environment and strengthening of environmental awareness
9) Respect to liberal, constructive and inductive

(3) COURSE CONTENT

The central aim of the course is the understanding of ecology and its association with organisms and their environment. The course desires to relay the enthusiasm of this rapidly evolving subject and wider scientific area to the students. Special emphasis will be given to issues of biological conservation and also to the use of new methodological tools in emerging areas of ecology like microbial ecology and evolution. The course main headlines:

1. Introduction to Molecular Ecology

2. Molecular identification: Species, Individual, Sex
3. Intrusion and adaptation of natural populations
4. Modern molecular techniques in molecular ecology
5. Genetically Modified Organisms – Release, Legislation, Safety and Risk assessment
6. Genetics of conservation of threatened species
7. Fundamentals of Molecular Microbial Ecology (Modern methods, applications and new ecological theories in the microbial world)
8. Metagenomics and microbial ecology

(4) TEACHING METHODS-ASSESSMENT

<table>
<tr><td>MODES OF DELIVERY
Face-to-face, in-class lecturing, distance teaching and distance learning etc.</td><td>In-class lecturing, face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Use of ICT in teaching, Laboratory Education, Communication with students</td><td>Use of power point presentations
Email communication with students
Upload of literature, examination papers and teaching material through e-class</td></tr>
<tr><td>COURSE DESIGN
Description of teaching techniques, practices and methods:
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.

The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</td><td><table><tr><th>Activity/Method</th><th>Semester workload</th></tr><tr><td>Lectures</td><td>26</td></tr><tr><td>Essay writing and presentaion</td><td>24</td></tr><tr><td>Theory study</td><td>30</td></tr><tr><td>Course total
(25 hours of workload per credit unit)</td><td>80</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS
Detailed description of the evaluation procedures:

Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc.</td><td>Students performance evaluation
• Through written exams at the end of the semester 70% of the final grade
• Presentation and writing essay assignment 30% of the final grade</td></tr>
</table>

Specifically, defined evaluation criteria are stated, as well as if and where they are accessible by the students.	

(5) SUGGESTED BIBLIOGRAPHY:

-Suggested bibliography

- Molecular Methods in Ecology, Allan J. Baker (Editor), D.T. Parkin, Blackwell Science Inc., 2000.
- Molecular Approaches to Ecology and Evolution, Rob Desalle (Editor), Bernd Schierwater (Editor), Birkhouse, 1998
- Microbial Ecology, L.L. Barton and D.E. Northup, (Willey & Sons) 2011

-Complementary bibliography

Lecture notes: presentations of the lectures are available in the e-class platform for all students to download