# UNIVERSITÀ DEGLI STUDI DI PALERMO

| DEPARTMENT | Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche |
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| ACADEMIC YEAR | 2017/2018 |
| MASTER'S DEGREE (MSC) | BIODIVERSITY AND ENVIRONMENTAL BIOLOGY |
| SUBJECT | BIOLOGICAL ANALYSIS OF ECOSYSTEMS |
| TYPE OF EDUCATIONAL ACTIVITY | B |
| AMBIT | 50506-Discipline del settore biodiversità e ambiente |
| CODE | 18625 |
| SCIENTIFIC SECTOR(S) | BIO/03 |
| HEAD PROFESSOR(S) | NASELLI FLORES LUIGI  Professore Associato       Univ. di PALERMO |
| OTHER PROFESSOR(S) | |
| CREDITS | 6 |
| INDIVIDUAL STUDY (Hrs) | 98 |
| COURSE ACTIVITY (Hrs) | 52 |
| PROPAEDEUTICAL SUBJECTS | |
| MUTUALIZATION | |
| YEAR | 1 |
| TERM (SEMESTER) | 1° semester |
| ATTENDANCE | Not mandatory |
| EVALUATION | Out of 30 |
| TEACHER OFFICE HOURS | **NASELLI FLORES LUIGI**<br>Monday      10:30   11:30   Studio del docente, Via Archirafi, 28 - I piano<br>Wednesday 10:30   11:30   Studio del docente, Via Archirafi, 28 - I piano<br>Friday        10:30   11:30   Studio del docente, Via Archirafi, 28 - I piano |

| PREREQUISITES | Good high-school mathematical skills, good abilities in reading English and in its listening, and basic knowledge of general Ecology are necessary to fruitfully attend the course. |
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| LEARNING OUTCOMES | Acquiring knowledge and comprehension abilities<br>The goals of the class is to get critical tools aimed at (i) identifying and understanding the regulation role of the biota in the different ecosystems, (ii) selecting and identifying the tropho-dynamic structure of ecological communities and (iii) analysing the biological interactions allowing ecosystem functioning.<br><br>Ability to apply knowledge and comprehension<br>Ability to autonomously build a bio-analytical protocol sized on specific environmental features to be investigated. Ability to illustrate both graphically and orally the results achieved.<br><br>Judgement autonomy<br>The course is aimed at developing a basic knowledge to evaluate the implications deriving from the selection of biological variables and the general results achieved through the analysis itself. Ability to analyse the principal features deriving from a biological assessment of (local and regional) communities and metacommunities.<br><br>Communication skills<br>The course will promote the ability to explain and sustain operative choices according to the biological structure and to the environmental features of the different ecosystems. In addition, the ability to underline the importance and the necessity to biologically monitor and control the environment even in (apparently) unimpacted ecosystems.<br><br>Learning skills<br>The course is aimed at developing the ability to critically analyse specialised scientific literature on the topics of the course. It is also aimed at facilitating the study required in a second-level degree or master course. |
| ASSESSMENT METHODS | A written exam is scheduled at the end of the course eventually integrated by 2-3 specific questions. The exam is addressed toward ascertaining the ability to determine the ecological status of a given ecosystem through the choice and the analysis of selected biondicators (biological analysis of an ecosystem). The test allows to demonstrate i) a basic knowledge on the selection of bioindicators (which grants a score ranging from 18 to 23), ii) a deeper knowledge on how to use autoecological (populations, including their phenotypic plasticity) and sinecological (community) knowledge to perform an environmental assessment (which grants a score ranging between 24 and 27), and iii) a capacity to make projection on future ecological scenarios (which grants a score ranging between 28 and 30 with honours). |
| EDUCATIONAL OBJECTIVES | According to the "manifesto" of the 2nd-grade course in Biodiversity and Environmental Biology, the goal of the course "Biological Analysis of Ecosystems" is to give to students a good knowledge on the scientific methods necessary to develop a critical vision on the role exerted by the organisms and their interactions on a suitable (meta)ecosystem functioning. The course is also aimed<br>at highlighting how human impacts on the biological structure of ecosystems may cause a threat to human survivorship. The cultural and technical skills useful to be an expert in the biological management will be also provided. Biological "deviations" will be also analysed in relation to ecotoxicological aspects dealing with the functioning of different ecosystems. |
| TEACHING METHODS | Frontal lectures (40 h) and exercise with the teacher (12 h). Lectures will be given in English if the class includes foreign students or upon request of the students. |
| SUGGESTED BIBLIOGRAPHY | Articoli su riviste internazionali selezionati dal docente saranno distribuiti agli studenti all'inizio del corso. Gli articoli consentiranno agli studenti di approfondire tutti gli aspetti trattati nel corso. La lista, in relazione ai costanti progressi scientifici in tale ambito, sara' aggiornata e modificata anno per anno.<br><br>Papers from selected literature will be distributed by the teacher at the beginning of the course. These papers will allow the students to deepen ALL the topic faced during the course. The list of the papers, depending on the scientific progresses in the field, will be updated and/or modified year by year. |

## SYLLABUS

| Hrs | Frontal teaching |
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| 8 | Introduction. Analysis of the ecological problems coming from the human use of natural resources. Human-induced impacts on the different ecosystems at a global scale. |

# SYLLABUS

| Hrs | Frontal teaching |
|---|---|
| 8 | Analysis of the biological structures in the different ecosystem typologies. Biodiversity and its role in maintaining the emergent properties of ecosystems: stability, resilience, resistance. Importance of biological redundancy. Analysis of human impacts on aquatic and terrestrial ecosystems. |
| 8 | Ecological relationships among the different biological compartment of ecosystems. Functional roles of organisms and analysis of their functional traits. Relationships between morphology and function in analysing the biological structure of ecosystems. |
| 8 | Morpho-functional traits and ecological role of organisms. Functional classifications vs. taxonomic classifications. How to identify and measure morpho-functional traits of ecological communities. Protocols for the analysis of the ecological state of ecosystems through the analysis of morpho-functional traits of organisms. |
| 8 | Functional classification of terrestrial and aquatic vegetation and their use in the analysis of ecosystems. C-S-R-classification and ecosystem trajectories. Functional analysis of zooplankton and macroinvertebrates. Fish functional groups |

| Hrs | Practice |
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| 6 | Exercise: how to apply morpho-fucntional analyses to characterise the ecological state of aquatic ecosystems |
| 6 | Exercise: how to apply morpho-functional classifications to characterise terrestrial ecosystems. |