



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche
<b>ACADEMIC YEAR</b>	2019/2020
<b>MASTER'S DEGREE (MSC)</b>	BIODIVERSITY AND ENVIRONMENTAL BIOLOGY
<b>INTEGRATED COURSE</b>	BIODIVERSITY II
<b>CODE</b>	19790
<b>MODULES</b>	Yes
<b>NUMBER OF MODULES</b>	3
<b>SCIENTIFIC SECTOR(S)</b>	BIO/05, BIO/02
<b>HEAD PROFESSOR(S)</b>	MANNINO ANNA MARIA Professore Associato Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	MANNINO ANNA MARIA Professore Associato Univ. di PALERMO CAMPOBELLO DANIELA Professore Associato Univ. di PALERMO MARRONE FEDERICO Professore Ordinario Univ. di PALERMO
<b>CREDITS</b>	9
<b>PROPAEDEUTICAL SUBJECTS</b>	
<b>MUTUALIZATION</b>	
<b>YEAR</b>	2
<b>TERM (SEMESTER)</b>	2° semester
<b>ATTENDANCE</b>	Not mandatory
<b>EVALUATION</b>	Out of 30
<b>TEACHER OFFICE HOURS</b>	<p><b>CAMPOBELLO DANIELA</b> Monday 09:00 17:00 Via Archirafi 18, Piano I, Stanza 18 - dal Lunedì al Venerdì, previo appuntamento concordato per email Tuesday 15:00 17:00 Sede del Consorzio Universitario, corso Vittorio Emanuele, 92, 93100 Caltanissetta</p> <p><b>MANNINO ANNA MARIA</b> Tuesday 9:00 11:00 Dipartimento STEBICEF - Via Archirafi n. 28, primo piano. Nota: Contattare preliminarmente il docente. Tel: 091-23891218; mail: annamaria.mannino@unipa.it</p> <p><b>MARRONE FEDERICO</b> Monday 10:00 11:00 Via Archirafi 18, primo piano, stanza I8 Tuesday 15:00 17:00 Sede del Consorzio Universitario, corso Vittorio Emanuele, 92, 93100 Caltanissetta Wednesday 10:00 11:00 Via Archirafi 18, primo piano, stanza I8 Friday 10:00 11:00 Via Archirafi 18, primo piano, stanza I8</p>

**DOCENTE:** Prof.ssa ANNA MARIA MANNINO

<b>PREREQUISITES</b>	To achieve the educational objectives, a basic knowledge of Botany, Zoology, Mathematics and English language is required.
<b>LEARNING OUTCOMES</b>	<p>Knowledge and understanding Students will acquire the scientific literature and terminology, with a special focus on the treated topics.</p> <p>Applying knowledge and understanding Students will gain the ability to apply and correctly use the acquired knowledge.</p> <p>Making judgements Students will gain the capability to evaluate the teaching activity. Students will acquire the ability to understand and to critically evaluate and interpret experimental data acquired in the field and in the laboratory.</p> <p>Communication Students will gain the ability to explain the acquired knowledge to both specialist and non-specialist audiences with clearness and a technical scientific language. Students will acquire the ability to present experimental data.</p> <p>Lifelong learning skills Students will gain the learning skills necessary to continuously update and deepen knowledge with a high degree of autonomy, through consultation of scientific articles and online data bank. Students will acquire the capability to undertake further studies (master, deepening courses, specialized seminars).</p>
<b>ASSESSMENT METHODS</b>	<p>A written beginning test is given to the students to assess their beginning preparation. The learning evaluation is made by an oral exam at the end of the course, consisting of questions on topics concerning the program of the course. The level of knowledge and understanding of the program topics, the ability to analyze and combine information obtained from the course and the use of an appropriate scientific terminology will be evaluated. The final mark is given considering the evaluation of each module and the active participation to the theoretical lessons. The final mark is assigned as a fraction of 30. The threshold to pass the exam is 18/30.</p> <p>Excellent (30-30 cum laude). Excellent knowledge of the topics, excellent property of language, good analytical ability. The student is also able to apply his/her knowledge to solve all proposed problems.</p> <p>Very good (26-29). Good mastery of the topics, full property of language. The student is able to apply his/her knowledge to solve proposed problems. Good (24-25). The student reached a basic knowledge of the main topics, discrete property of language, with limited ability to independently apply his/her knowledge to the solution of the proposed problems. Satisfactory (21-23). The student does not have full mastery of the main topics, but he/she possesses the knowledge, satisfactory property of language, poor ability to independently apply the acquired knowledge. Sufficient (18-20). The student has a minimum basic knowledge of the main topics and technical language issues, very little or no ability to independently apply the acquired knowledge. Insufficient. The student does not have an acceptable knowledge of the contents of the topics covered in the course.</p>
<b>TEACHING METHODS</b>	Lectures held also in the computer room.

**MODULE  
INLAND WATERS ZOOLOGY**

*Prof. FEDERICO MARRONE*

**SUGGESTED BIBLIOGRAPHY**

Limnoecology: The Ecology of Lakes and Streams – Lampert & Sommer – Oxford University Press

Limnological Analyses – Wetzel & Likens – Springer

<b>AMBIT</b>	20490-A scelta dello studente
<b>INDIVIDUAL STUDY (Hrs)</b>	51
<b>COURSE ACTIVITY (Hrs)</b>	24

**EDUCATIONAL OBJECTIVES OF THE MODULE**

The main educational objective of the class is to provide the students the necessary theoretical knowledge to investigate and interpret the diversity patterns of Palearctic inland water biota, with a special focus on Sicily. In particular, the Class will focus on the sampling and study techniques of the invertebrates of lentic and lotic waters. Moreover, the Class will provide a basic knowledge of the Sicilian and Italian biotas in the frame of the West-Palaeartic fauna.

**SYLLABUS**

Hrs	Frontal teaching
4	The inland waters of Sicily
6	Basics of Limnology and limnological sampling techniques
4	The inland water fauna of Sicily
2	Accumulation and rarefaction curves. Asintotic species richness
4	Crustaceans from Sicilian inland waters
2	The Sicilian aquatic herpetofauna
2	Final review

**MODULE  
WATER BOTANY**

*Prof.ssa ANNA MARIA MANNINO*

**SUGGESTED BIBLIOGRAPHY**

ESTI DI RIFERIMENTO (REFERENCE TEXT)

Mauseth J. (2014). Botanica. Fondamenti di Biologia delle piante. 3a Ed., Idelson-Gnocchi

Appunti forniti dal docente (PDF)

TESTI PER APPROFONDIMENTI (TEXT FOR DEEPENING)

Cornaci M., Furnari G., Giaccone G. (2003). Macrofitobenthos. In: Manuale di metodologie di campionamento e studio del

benthos mediterraneo (M.C. Gambi e M. Dappiano Ed.). Biologia Marina Mediterranea. Vol. 10 (suppl.): 233-262 Graham

L.E., Wilcox L.W. (2000). Algae. Prentice Hall. Upper Saddle River, NJ Lee R.E. (1999). Phycology. 3rd Edition. Cambridge

I Quaderni Habitat – Ministero dell'Ambiente e della Tutela del Territorio e del Mare. Disponibili su: <http://www.minambiente.it/pagina/i-quaderni-habitat-collana>

<b>AMBIT</b>	20490-A scelta dello studente
<b>INDIVIDUAL STUDY (Hrs)</b>	51
<b>COURSE ACTIVITY (Hrs)</b>	24

**EDUCATIONAL OBJECTIVES OF THE MODULE**

Students will deepen the knowledge on biology, taxonomy and ecology of algae, marine and continental, and aquatic phanerogams. Students will acquire knowledge on methodological techniques and tools for studying vegetable communities of aquatic environments, with particular attention to the Mediterranean environments, and for identifying algae and aquatic phanerogams.

**SYLLABUS**

Hrs	Frontal teaching
4	Topics and objectives of the course. From prokaryotes to eukaryotes.
7	Algae (Cyanophyta, Rhodophyta, Chlorophyta, Heterokontophyta).
5	Aquatic phanerogams.
4	Ecological role of algae and phanerogams in aquatic ecosystems.
4	Techniques for studying aquatic vegetable communities.

**MODULE**  
**QUANTITATIVE METHODS IN BIOLOGY**

*Prof.ssa DANIELA CAMPOBELLO*

**SUGGESTED BIBLIOGRAPHY**

- M. C. Whitlock & D. Schluter. 2010. Analisi statistica dei dati biologici. Ed. Zanichelli.
- Materiale didattico fornito dal docente.

<b>AMBIT</b>	20490-A scelta dello studente
<b>INDIVIDUAL STUDY (Hrs)</b>	51
<b>COURSE ACTIVITY (Hrs)</b>	24

**EDUCATIONAL OBJECTIVES OF THE MODULE**

Aim of the course is to provide students basic tools for most common data analyses adopted in botanical and zoological studies. Specifically, students would acquire skills relative to

- design a proper protocol of data sampling
- quantitatively and independently analyzing data
- interpretation of results in relation to the study hypothesis
- clearly represent results

Course topics will be restricted to a limited number of statistical techniques yet most frequently used in Life Science investigations. For each method will be shown its logic basic and proper use to be chosen among a variety of other tests. Contrariwise, technicalities and math bases of quantitative methods are not part of the course. The correct use of each quantitative method will be taught mostly by showing real and fictitious study cases. Specifically, the course will focus on variable descriptors (frequency distribution, mean, variance, errors), diversity indexes, analysis of variance, regression and linear models. The practice part of the course will be hold with R software and its packages.

**SYLLABUS**

<b>Hrs</b>	<b>Frontal teaching</b>
4	Introduction to quantitative methods in biology, descriptive indexes, experimental design
4	Main softwares used in biological analyses, R Studio and its basic packages
4	Matrixes and data treatment
4	Comparison between two or more samples
4	Correlation, regression and linear models
4	Data rapresentation, tables and graphs,