



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
<b>ACADEMIC YEAR</b>	2023/2024		
<b>BACHELOR'S DEGREE (BSC)</b>	ANIMAL PHARMACEUTICALS AND NUTRACEUTICALS		
<b>INTEGRATED COURSE</b>	ANIMAL BIOLOGY AND ZOOLOGY		
<b>CODE</b>	22950		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	2		
<b>SCIENTIFIC SECTOR(S)</b>	BIO/05		
<b>HEAD PROFESSOR(S)</b>	ARCULEO MARCO	Professore Ordinario	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	MAURO MANUELA	Ricercatore a tempo determinato	Univ. di PALERMO
	ARCULEO MARCO	Professore Ordinario	Univ. di PALERMO
<b>CREDITS</b>	12		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	1		
<b>TERM (SEMESTER)</b>	1° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<p><b>ARCULEO MARCO</b></p> <p>Monday 13:00 14:30 Stanza del docente, Dipartimento STEBICEF, Via Archirafi 18, I piano</p> <p>Wednesday 11:00 13:00 Stanza del docente, Dipartimento STEBICEF, Via Archirafi 18, I piano</p> <p>Thursday 13:00 14:30 Stanza del docente, Dipartimento STEBICEF, Via Archirafi 18, I piano</p> <p><b>MAURO MANUELA</b></p> <p>Wednesday 13:00 15:00 Via Archirafi, 18- Primo piano</p>		

DOCENTE: Prof. MARCO ARCULEO

<b>PREREQUISITES</b>	Knowledge and understanding. Acquisition of skills related to the knowledge of invertebrates and vertebrates through their morphological description and the use of dichotomous keys for their identification. Acquisition of skills related to knowledge of animal biology, evolutionary processes and mechanisms of animal species and aspects related to the study of biodiversity.
<b>LEARNING OUTCOMES</b>	Knowledge and understanding Acquisition of theoretical and experimental skills related to the knowledge of vertebrates and invertebrates, their evolution, biology, evolution, adaptation and systematics. Acquisition of a specialized scientific language. Ability to apply knowledge and understanding. Acquisition of applied skills to identify the species covered during the course and understand their biology, evolution and adaptations. Judgment autonomy Acquisition of skills and competences for the purpose of recognizing the species covered by the course, their structure, biology, evolution and adaptation. Communication skills Acquisition of adequate skills and tools for communication, as regards the presentation of the results of studies in the zoological field, the communication and dissemination of information on issues concerning the topics of the lessons. Learning ability Acquisition of adequate skills for the independent achievement of supplementary skills, with reference to: consultation of literature, access to databases and other information on the Internet, basic cognitive tools for continuous updating of knowledge.
<b>ASSESSMENT METHODS</b>	A short test is given to the students to assess their individual preparation at the beginning of the course. Then both the methodologies and the modalities of the ongoing evaluation are presented. The ongoing evaluation takes place in the middle of the course. The learning evaluation is completed by an oral exam at the end of the course. Excellent (30-30 cum laude). Excellent knowledge of the topics, excellent properties of language, good analytical ability. The student is also able to apply his/her knowledge to solve all proposed problems 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 properties of language, with limited ability to independently apply the his/her knowledge to the solution of the proposed problems. Satisfactory (21-23). The student does not have full mastery of the main topics of teaching, but it possesses the knowledge, satisfactory property 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.
<b>TEACHING METHODS</b>	Lectures

## MODULE ZOOLOGY

*Prof. MARCO ARCULEO*

### SUGGESTED BIBLIOGRAPHY

- Baccetti et al. - Trattato Italiano di Zoologia Vol I - II - Zanichelli 1990 ISBN: 9788808093660  
- Appunti a lezione/Lecture notes.

<b>AMBIT</b>	50144-Discipline Biologiche e Morfologiche
<b>INDIVIDUAL STUDY (Hrs)</b>	102
<b>COURSE ACTIVITY (Hrs)</b>	48

### EDUCATIONAL OBJECTIVES OF THE MODULE

The discipline provides the contents necessary for the study of zoology through the morphological description of the main groups of invertebrates and vertebrates and their taxonomy. The student will acquire skills related to the main anatomical and morphological characteristics of vertebrates and invertebrates as well as the use of dichotomous keys useful for the identification of the main groups treated during the course.

## SYLLABUS

Hrs	Frontal teaching
2	Protists and Protozoa
4	Myxozoa; Placozoa; Mesozoa; Porifera
2	Cnidarians
4	Flatworms; Gnatostomulids; Nemertini; rotifers; Cyclophores
4	Nematodes; nematomorphs; Acanthocephali; Gastrotrichous; Quinorinchis
2	Loriciferans; Priapulides; Endoprocti
6	Mollusc
2	Anellids
2	Lofoforati
6	Artropods e Para-artropods
4	Ketognaths; Echinoderms
10	Urochordates; Cephalochordates; Vertebrates

**MODULE  
ANIMAL BIOLOGY**

*Prof.ssa MANUELA MAURO*

**SUGGESTED BIBLIOGRAPHY**

Hickman, Keen, Eisenhour, Larson, L'Anson. Zoologia. Edizione Italiana a cura di Vincenzo Arizza, Olimpia Coppellotti, Laura Guidolin. Diciottesima edizione. McGraw-Hill

David Sadava, David M.Hillis, H. Graig Heller, Sally Hacker. Biologia. Volume 5. La Biologia degli animali. Quinta edizione. Giugno 2019.

Materiale fornito dal docente.

<b>AMBIT</b>	50144-Discipline Biologiche e Morfologiche
<b>INDIVIDUAL STUDY (Hrs)</b>	102
<b>COURSE ACTIVITY (Hrs)</b>	48

**EDUCATIONAL OBJECTIVES OF THE MODULE**

The course aims to provide the basic notions of Animal Biology which represent a tool for tackling interdisciplinary scientific studies. In particular, the course aims to provide the fundamental notions relating to the concept of biodiversity and evolutionary aspects and/or theories related to it. The distinctions between eukaryotic and prokaryotic, autotrophic and heterotrophic organisms will be mentioned, preliminary notions for the approach to study and knowledge: of the principles of development; homeostasis, excretion and thermoregulation; reproductive processes and animal structures and architectures for support, protection and movement; internal fluids and breathing; of digestion and nutrition, feeding mechanisms and nutritional requirements. A focus will be devoted to the study of the immune system as a tool to evaluate the responses to stress of organisms. In the final phase, some case studies will be evaluated regarding the possibility of extracting bioactive molecules from marine organisms with antimicrobial or anticancer activities and/or the possibility of using food products of different origins for maintaining animal health. During the course, the holding of in-depth seminars will be taken into consideration.

**SYLLABUS**

<b>Hrs</b>	<b>Frontal teaching</b>
6	Introduction to the course. Definition of living organisms: prokaryotes, eukaryotes, autotrophs and heterotrophs. Notes on evolutionary theories, concept of speciation, natural selection, genetic drift, stabilizing and directional selection. Notes on animal taxonomy and phylogeny.
5	Biodiversity concept, native, allochthonous, accidental, keystone species. Possible causes and consequences of biodiversity loss. Environmental DNA.
4	Principles of animal development
4	Homeostasis, osmotic regulation, excretion and thermoregulation.
4	Reproductive process
5	Support, protection and movement. Animal architecture
4	Internal fluids and breathing
5	Digestion and nutrition, feeding mechanisms, organization of the alimentary canal, nutritional requirements.
6	The immune system is a tool for assessing the health of organisms. Case studies on marine biodiversity subjected to different types of stress: biomarkers and bioindicators. Focus on the immune system of some invertebrate species
3	Notes on animal behavior. Case of studies of behavioral responses in animals subjected to stress conditions
2	Extraction of bioactive molecules from marine organisms or human activity waste. Potentiality, uses and applications in the antimicrobial, anticancer and animal food fields