



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare		
ACADEMIC YEAR	2021/2022		
BACHELOR'S DEGREE (BSC)	NATURAL AND ENVIRONMENTAL SCIENCE		
INTEGRATED COURSE	ZOOLOGY - INTEGRATED COURSE		
CODE	07744		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/05		
HEAD PROFESSOR(S)	CAMMARATA MATTEO	Professore Ordinario	Univ. di PALERMO
OTHER PROFESSOR(S)	PARISI MARIA GIOVANNA	Professore Associato	Univ. di PALERMO
	CAMMARATA MATTEO	Professore Ordinario	Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	CAMMARATA MATTEO Monday 09:00 11:30 Viale delle Scienze ED 16 Dipartimento della terra e del mare PARISI MARIA GIOVANNA Monday 10:00 12:00 Viale delle Scienze, Edificio 1690128 Palermo Tuesday 11:00 13:00 Polo territoriale di Trapani Sedi di svolgimento delle attività didattiche (Principe di Napoli, TP) Colloquio on line per appuntamento Wednesday 10:00 12:00 Viale delle Scienze, Edificio 1690128 Palermo		

DOCENTE: Prof. MATTEO CAMMARATA

PREREQUISITES	none
LEARNING OUTCOMES	Knowledge and comprehension Acquisition of theoretical and methodological knowledge in the field of zoology for the understanding of the basic tools of the taxonomy and classification. Knowledge on current and historical causes of species distribution and adaptations. Recognition, through the use of specific systematic keys, of the main species that constitute the Italian fauna. Applying knowledge and comprehension. Ability to use independently the acquired knowledge that are in naturalistic preparation in an evolutionary context. Ability to process biological data to describe the state of the environment depending on the present species. Autonomous thinking. Personal interpretation of the data and an informed assessment of the level of integration of the animal component in natural and altered systems. Communication ability. Ability to present results and the acquired skills with good use of language and to disclose knowledge with scientific strictness. Acquisition of the relational capabilities which are indispensable to collaborate in multidisciplinary studies in the laboratory and in the field. Learning ability. Acquired skills to find information from the international zoological literature and to deepen and constantly update the material.
ASSESSMENT METHODS	EXAM: final oral tests. The student will be evaluated based on the level of knowledge of the subjects and the ability to link between them, the clarity and the use of a specialized scientific language. EVALUATION CRITERIA -assessment: excellent, grade: 30 - 30 cum laude, excellent knowledge of the topics of the course, excellent use of language, excellent analytical capacity, ability to apply knowledge to problem solving; - assessment: very good, grade: 26-29, good knowledge of the topics of the course, correct use of language, good analytical capacity, ability to apply knowledge to problem solving; - assessment: good, grade: 24-25, good knowledge of the main topics of the course, correct use of language, limited ability to autonomously apply knowledge to problem solving; - assessment: satisfactory, grade: 21-23, partial knowledge of the topics of the course, satisfactory use of language, limited ability to autonomously apply knowledge to problem solving; - assessment: sufficient, grade: 18-20, minimal knowledge of the main topics of the course and of technical language, scarce ability or inability to autonomously apply knowledge to problem solving; - assessment: fail, insufficient knowledge of the topics of the course.
TEACHING METHODS	The course includes hours of classroom lectures and laboratory. The teaching will be developed integrated in parallel by the two teachers in relation to their relative skills and integrations, with classroom lectures and teaching methodology laboratory. The teachers, during the course, will also provide students with specific study material and presentations of the lessons.

**MODULE
GENERAL ZOOLOGY**

Prof. MATTEO CAMMARATA

SUGGESTED BIBLIOGRAPHY

Hickman et al. Fondamenti di Zoologia Ed. Mc GrawHill
De Bernardi et al Zoologia Parte generale Idelson Gnocchi
Baccetti et al. Trattato Italiano di Zoologia. Vol. I Ed. Zanichelli

AMBIT	50176-Discipline naturalistiche
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56

EDUCATIONAL OBJECTIVES OF THE MODULE

Objective of the course is provide students with a comprehensive knowledge of Animal Kingdom biodiversity applying an evolutionary approach.
The course aims to raise awareness of the theories, the scientific foundations of systematic and phylogeny of animal evolution, the levels of organization and training plans of the major phyla. The course also highlights the body interactions / population environment.

SYLLABUS

Hrs	Frontal teaching
12	BASIC CONCEPTS OF SYSTEMATIC, PHYLOGENESIS AND EVOLUTION Animal classification, theoretical assumptions and methods. The theories and the scientific basis of evolution. Microevolution. The concept of population and species. the biological basis of the evolution
4	Introduction to Systematic Zoology Levels of hierarchical organization of animal complexity, systematic profile. The bauplan of the main phyla and their evolution. Origin and evolution of the main taxa.
4	Principles and methods of classification. Use and Application of morphological and molecular data in the phylogenetic reconstruction
6	MORPHO-FUNCTIONAL ZOOLOGY General concepts and basic principles of animal life; heterotrophic, motility; reproduction and reproductive strategies. Bauplan and organization levels; symmetry; segmentation; body cavity; musculoskeletal systems.
10	MORPHO-FUNCTIONAL ZOOLOGY Main functions: nutrition, breathing, bloodstream, excretion, osmoregulation, thermoregulation, support, movement, nervous and endocrine coordination, reception sensory, sexuality and reproduction , development and life cycles. Interactions between organisms: symbiosis, commensalism, parasitism.
4	BEHAVIORAL ZOOLOGY Migration, environmental adaptations, Mimicry. reproductive biology, eco-ethology.
Hrs	Workshops
16	Behavioral morpho-functional zoology, Development of animal models

MODULE SYSTEMATIC ZOOLOGY

Prof.ssa MARIA GIOVANNA PARISI

SUGGESTED BIBLIOGRAPHY

Hickman et al. *Diversita' Animale* Ed. Mc GrawHill
De Bernardi et al. *Zoologia Parte sistematica* Idelson Gnocchi
Baccetti et al. *Trattato Italiano di Zoologia*. Vol. II Ed. Zanichelli

AMBIT	50170-Discipline biologiche
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56

EDUCATIONAL OBJECTIVES OF THE MODULE

According to the "manifesto" of the degree course "Scienze della Natura e dell'ambiente" the final target of the course of general and systematic zoology is to give to students a good knowledge on contents and methods pertaining the necessary tools to the study of zoology on the basis of the previously introduced theories, mechanisms and the scientific basis of animal evolution. Here we provide (i) the theoretical tools of phylogenetic cladistics-classification. Bauplan and organization levels of Protozoa and Metazoa organisms. (iii) Reproduction and reproductive strategies; development and life cycles. Students acquire skills in the use of systematic keys useful for the identification of the main groups of invertebrates and vertebrates

SYLLABUS

Hrs	Frontal teaching
2	Introduction to the study of Metazoans. Protists: unicellularity, support, locomotion, feeding, osmotic regulation, multiplication, reproduction. Outline of group systematics.
2	Porifera: Appearance of multicellularity. Characteristics and systematics of the Phylum
2	Cnidarians: habitats and life cycles (Hydrozoa, Sciphozoa, Staurozoa, Anthozoa). Ctenophores
2	Platelmintes: triblastic and acheloma condition. The protonephridial system. Turbellaria. Trematoda and Cestoda: general characters and organization of the body.
2	Morphological characteristics, adaptations and phylogeny of MOLLUSKS
2	Morphological characteristics, adaptations and phylogeny of the Annelids
3	The process of arthropodization and the moult. Main characteristics of Arthropods. The Myriapods: Organization of the body and evolutionary tendencies. Insects: morphology and adaptation
3	Arthropods Chelicerates and Crustaceans: Organization of the body, adaptation and evolution
5	LOPHORATES AND MINOR ECDISOZOA Rothiphere, Acanthocephala, Lophophorata, Gastrotricha, Chetognatha, Nemathoda, Nemathomorpha, Kinorincha, Priapulida, Loriciphera, Tardigrada and Onychophora
2	Deuterostomes: Echinoderms: organization and functions of the aquifer system. Crinoids, Asteroids, Ophiuroids, Echinoids and Holoturoids.
3	The organizational plan of the Chordates: dorsal chord, neural tube and branchial pharynx. Morphological and evolutionary characters of Urocordates and Cephalochordates
12	Living agnates. The Chondrichthyes and the Osteitties. Internal and external morphology of Amphibians and larval development. The Reptiles. Adaptations to terrestrial life and embryonic appendages of the egg of the amniotes. Birds. Adaptations on the fly. Mammals, characteristics of prototypes, metaterals and eutherians.
Hrs	Workshops
16	Animal observation and recognition. systematic key use with particular emphasis to Mediterranean fauna