



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare
ACADEMIC YEAR	2023/2024
BACHELOR'S DEGREE (BSC)	NATURAL AND ENVIRONMENTAL SCIENCES
SUBJECT	MARINE INVERTEBRATES ZOOLOGY
TYPE OF EDUCATIONAL ACTIVITY	D
AMBIT	10552-A scelta dello studente
CODE	19783
SCIENTIFIC SECTOR(S)	BIO/05
HEAD PROFESSOR(S)	CAMMARATA MATTEO Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	98
COURSE ACTIVITY (Hrs)	52
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	3
TERM (SEMESTER)	2° 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

DOCENTE: Prof. MATTEO CAMMARATA

PREREQUISITES	nessuno
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.
EDUCATIONAL OBJECTIVES	In this course, students investigate the zoology of living marine invertebrates: their functional morphology, behaviour, ecology and phylogenetic relationships. The student will have to possess advanced knowledge of the patterns, processes and evolutionary mechanisms that have led to the diversity of marine invertebrates, including the integrated morpho-functional adaptations (morpho-molecular and morpho-physiological) underlying the evolutionary success of the main groups of marine invertebrates. In particular, the student will be able to identify and comparatively describe the main morpho-functional adaptive traits in marine invertebrate taxa; describe organism-environment relationships in terms of selected adaptive structures and functions; to know the different aspects of the life cycle of marine species that constitute 'case studies, representative of the marine domains (plankton, benthos, nekton) in relation to evolutionary traits. They will also be able to acquire knowledge about changes in biodiversity in relation to recent climate changes and extreme environments. This knowledge may be useful both in the continuation of naturalistic and biological studies and in any professional application.
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.
SUGGESTED BIBLIOGRAPHY	Le Edizioni più recenti di Invertebrate Zoology: A Functional Evolutionary Approach (Ruppert, Fox & Barnes, 7a ed., 2003) o Invertebrates (3a ed.) 2016 di Brusca RC, Moore, W e Shuster, SM.

SYLLABUS

Hrs	Frontal teaching
4	Evolutionary and adaptive morphology of marine invertebrates
6	Benthos: animali che si rapportano ai fondali marini. La distribuzione verticale e le principali comunità animali: il sistema litorale, sopralitorale, intertidale, infralitorale, circalitorale.
6	Plankton: animals that float in the water column. Adaptations: shapes, buoyancy, colours. Classification: dimensional criteria of zooplankton and related to the life cycle. The role of zooplankton in the cycle of matter.
6	Nekton: animals that actively swim in the water column. Representative taxa.
6	Adaptations of animals in relation to the nature of the substrate, depth, latitude. Marine bio-constructions: animals that build reefs. Animal diversity in relation to recent climate and global changes.

SYLLABUS

Hrs	Frontal teaching
4	Invertebrates in extreme environments
8	Use of taxonomic keys for the classification of taxa treated during the course with particular reference to the Mediterranean fauna

Hrs	Practice
12	Observation and recognition of animal organisms Use of systematic keys for the classification of taxa treated during the course with particular reference to the marine Mediterranean invertebrate fauna. Compatibly with the resources available to the CdS and the health situation, a few hours of the laboratory can be carried out in the field, in the form of educational excursions