

# COASTAL AND MARINE BIOLOGY AND ECOLOGY (LM51)

(Lecce - Università degli Studi)

## Teaching EXPERIMENTAL DESIGN AND METHODOLOGIES FOR MARINE BIOLOGY

GenCod A005730

**Owner professor** LUIGI MUSCO

### Reference professors for teaching

Giulia FURFARO, LUIGI MUSCO, SERGIO ROSSI

**Teaching in italian** EXPERIMENTAL DESIGN AND METHODOLOGIES FOR

**Teaching** EXPERIMENTAL DESIGN AND METHODOLOGIES FOR MARINE

**SSD code** BIO/05

**Reference course** COASTAL AND MARINE BIOLOGY AND ECOLOGY

**Course type** Laurea Magistrale

**Credits** 6.0

**Teaching hours** Ore-Attivita-frontale: 54.0

**For enrolled in** 2021/2022

**Taught in** 2022/2023

**Course year** 2

**Language** INGLESE

**Curriculum** Curriculum Marine Biology and Ecology

**Location** Lecce

**Semester** Primo-Semestre

**Exam type** Orale

**Assessment** Voto-Finale

**Course timetable**

<https://easyroom.unisalento.it/Orario>

### BRIEF COURSE DESCRIPTION

The course will deal with the main techniques for studying the coastal marine environment also through scuba diving and from the sea surface, on board of the research vessel Pelagia.

### REQUIREMENTS

No requirements are foreseen to attend the course and practicals on board of the R/V PELAGIA. A diving licence is required to attend underwater SCUBA diving practicals.

### COURSE AIMS

The aim is to provide both theoretical and practical basic knowledge on the techniques of studying the marine environment also by means of a scientific diver or by sampling from sea surface on board of a research vessel.

### TEACHING METHODOLOGY

The course will be run by theoretical lessons (3 credits, 24 hours) and practical exercises in the field (3 credits, 30 hours).

### ASSESSMENT TYPE

The achievement of the credits attributed to teaching is obtained through an oral presentation of how each student would carry out an experiment in the fields of marine biology and ecology. The students should follow the hypothetico-deductive method and use methodologies learned during the course in order to test their hypothesis. This will evaluate the learning outcomes acquired by the student. The presentation will be followed by a question time with direct interview with the teachers. Upon motivated request of the student, the oral presentation is completely replaced by a full oral exam. The final grade is expressed in thirtieths, with possible praise. To pass the exam it is necessary to obtain a minimum score of 18 points, equal to a grade of 18/30. If the exam is insufficient, or the final score is less than 18, the presentation must be repeated or replaced by a full oral exam based on the student will. Following a double failure to pass the presentation test (due to insufficiency or non-acceptance of the grade obtained), the exam can only be taken by interview with the teachers. The attribution of the final score will be taken into account: of the level of theoretical and practical knowledge acquired (50%); the ability to apply the acquired knowledge (30%); autonomy of judgment (10%); of communication skills (10%).

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## FULL SYLLABUS

General: Physiological effects of immersion on humans. Diving equipment: breathing systems and the use of mixtures; protection systems and cold water diving; communication systems; transport systems; cave diving. Destructive sampling techniques: scratches, panels, sorbonne, nets, traps. Non-destructive sampling techniques: squares, transects, video and photographic surveys, visual-census. ROV (remotely operated vehicles). Underwater environmental volunteering projects. Transplant techniques. Use of sensors. Use of underwater lifting bag for marine litter removal and for displacement of heavy underwater equipment.

Details: Autonomous scuba diving, basic instrumentation for underwater research. Underwater activities in the various scientific disciplines: areas and specificities. Physical and chemical oceanography: currentometry, underwater optics, water sampling. Portable control units. Criteria of accessibility and specificity in the approach to submarine habitats. Geology: topography, clinometry, morphometry, sedimentology, ripple-marks, penetrometry. Portable underwater sonars.

Biology and ecology. Experimental design for field studies. Scientific immersion in the study of the pelagic environment and the benthos. Qualitative, quantitative, qualitative-quantitative surveys. Numerical descriptors: biomass and biovolume; abundance and density; roofing and covering; frequency. Destructive methods, non-destructive methods. Grating. Sorbona (air-lift sucking pump). Photo detection. Circumscribed and non-circumscribed visual methods: squares and transects. Orthogonal and parallel transects. Type of parallel transects: Line Intercept Transect (LIT), Point Intercept Transect (PIT); Chain Transect (CT); Belt Transect (BT). National, EU and international regulations for scientific diving. Training and updating. Operating procedures. Technical and psychophysical requirements. Civil liability. Eligibility, insurance, certificates, dive booklets. Coordination of scientific immersion within the European Union. Notes on Legislative Decree 626/94 "Safety in the workplace". Risk assessment in scientific diving. Good practices for the safe performance of ISPRA and Environmental Agencies underwater activities

Possible case studies:

Installation of anti-jellyfish nets

Monitoring colonial invertebrates: a case study with 10x10, 20x20 squares, visual collection (picking up). Manipulative experiments

Posidonia: counting and measuring shoots and leaves, lepidocronology, epiphyte coverage.

Definition and notes on the safety of scientific diving.

Microplastic sampling with screen - sorting

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## REFERENCE TEXT BOOKS

Abbiati, M (ed.) (1991) *Metodi di campionamento biologico subacqueo*. In *Lezioni del Corso Formativo per Ricercatore Scientifico Subacqueo*. Pisa: International School of Scientific Diving, pp. 3–12. [Google Scholar](#)

Bianchi, CN, Pronzato, R, Cattaneo-Vietti, R, Benedetti-Cecchi, L, Morri, C, Pansini, M, Chemello, R, Milazzo, M, Frascchetti, S, Terlizzi, A, Peirano, A, Salvati, E, Benzoni, F, Calcinai, B, Cerrano, C and Bavestrello, G (2004) *Hard bottoms*. In Gambi, M and Dappiano, M (eds), *Mediterranean marine benthos: a manual of methods for its sampling and study*. *Biologia Marina Mediterranea* 11 (Suppl. 1), 185–215.

Hiscock, K and Hoare, R (1973) *A portable suction sampler for rock epibiota*. *Helgolander Wiss. Meeresunters* 25, 35–38. [10.1007/BF01609959CrossRef | Google Scholar](#)

Danovaro R. *Biologia marina. Biodiversità e funzionamento degli ecosistemi marini*. II edizione UTET ISPRA 2010. *Metodologie di studio del Plancton marino*.

Gambi M.C., Dappiano M. 2004 (eds) *"Mediterranean marine benthos: a manual of methods for its sampling and study"* SIBM.