Master's Degree in Marine Ecology

Practicals available in the subjects (2021-21)

Subject	Practical description	Techniques – Content covered
Ecosystem Dynamics and Exploitable Living Resources	• Identification of commercial species • Biological sampling • Data analysis	• Use of species identification guides • Collection of individual data: length, weight, sex, maturity, otolith extraction, stomach contents • Interpretation of collected information • Data analysis: diversity indices and multivariate analysis, mean length, length-weight relationship, sex ratio, gonadosomatic index, length-age keys, Von Bertalanffy equation, trophic indices
Coastal Ecology	• Field trip to Alcanada (phanerogams) - conservation status of posidonia • Characterisation of supralittoral communities on rocky coasts and their relationship with coastal models	• Linear cover of phanerogams (with tape measure) • Micro-cover of phanerogams (with ruler) • Sheaf density (with ruler) • Burial level (with ruler) • Data analysis to know the conservation status of posidonia by means of the parameters analysed • Use of a multiparametric sensor (OTT HL4, O2, temp, pH) • Elaboration of topographic profiles • Zonation of humectation and profile colouring • Zonation of communities on the topographical profile • Abundance characterisation in different niches (pools, crevices, etc.) • Comparison of *M. neritoides* morphometrics in splash zone and spray zone

Marine Bioindicators	• Comparison of marine communities and associated organisms in environments with different degrees of anthropogenic alterations	• Sampling using different techniques on hard and soft coastal bottoms • Identification of organisms and recognition of bioindicator species in the laboratory • Data analysis and use of environmental quality assessment indices
Phytoplankton Ecology	• Phytoplankton survey instrumentation • Methodology for the identification of different picophytoplankton groups and abundance and biomass measurements • Methodology for measuring phytoplankton growth and herbivory	• Use of microscopes (different types, i.e. epifluorescence, inverted) • Flow cytometer for peak abundance measurements, nanophytoplankton • Utermöhl technique • Refined dilution technique for measuring phytoplankton growth rates and herbivory • Chlorophyll measurement
Marine Microbiology	• Methods for the study of marine microbiology	• PCR • Bioinformatics • Bacterial respiration • Flow cytometer for heterotrophic bacterial counting • Epifluorescence microscopy (DNA staining with DAPI) • Enzyme activity
Marine Ecology	• Methods to study primary production and nutrient cycling	• Primary production of marine phanerogams by the micro-Winkler method • Chlorophyll content of marine phanerogam leaves • Organic and inorganic content of marine phanerogam leaves • Nitrogen fixation (acetylene reduction assay) by gas chromatography

		• Alkaline phosphatase activity (APA) • Colorimetric measurements of PO_4^{3-} and fluorometric measurements of NH_4^+
Integrated Practices	• Oceanographic campaign techniques	• Oceanographic campaign plan in estuarine systems and on-board manoeuvres • Launching and collection of CTD by hand from a small boat • Sampling for chlorophyll and nutrient analysis • Vertical fishing for the observation of plankton communities integrated in the water column • Secchi disc • Sample preservation • Data analysis: processing and analysis of CTD data • Sample analysis: chlorophyll analysis, planktonic community observation, photometric nutrient analysis with PrimeLab reagents (nitrate, nitrite, ammonium, phosphates and silicates)
Integrated Practices (Minorca)	• Coastal field work techniques	• Campaign plan. Field Work • Benthic transects in the coastal zone: taxonomic inventories and diversity indices • Bioindicator indices in phanerogam meadows: • Adapted FORAM Index (FI) / Lifespan Index (I_{LS})
Oceanographic Biology	• Field trips to analyse different environments and their associated biota • Adaptation of organisms to the environment	• Cala Pi-Cala Beltran: Reef system equivalent to modern tropical scenarios. Identification of the different coral species that make up the reef. Detection of morphological changes in the colonies associated with their bathymetric position. Identification of fauna associated with reef environments.

		• Cala Llombards-Mirador des Pontàs: Identification of mangrove environments and restricted areas with shallow laminar stromatolites. Identification of large microbial bio-constructions (thrombolites), equivalent to those occurring in the infralittoral settings of the Bahamas • Portopí: Identification and analysis of different types of infralittoral and mediolittoral microbialites, comparable to those occurring in Hamelin Pool (Shark Bay). Oyster beds under restricted conditions.
Management of Marine Resources	No practicals available	No practicals available
Experimental Design: Sampling and Data Processing	• Experimental design and data handling	• Techniques for marine survey design • Data analysis • Basic elements of experimental design • Sampling techniques • Basic statistical analyses and their requirements • General, generalised and mixed linear models • Multivariate statistics