UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Marine Ecology

2122-1-F7502Q004-F7502Q005M

Aims

This course examines biological aspects of ocean ecosystems and the physical processes that regulate them. Topics include the distributions, abundances, and interactions of marine organisms; interactions between organisms and the transformation and flux of energy and matter in marine ecosystems; and aspects of physiology related to marine species distributions, abundances and roles.

Lectures facilitate understanding 1) the complex nature of the process that affect and control marine biodiversity; 2) become familiar with multiple definitions and measures of marine biodiversity; 3) identify threats to marine biodiversity and what mechanisms are developing to identify and manage biodiversity loss; 4) of the impact and rapid spread of non-indigenous marine species, methods of introduction and spread, and current control measures; 5) gain knowledge of how major fisheries management programs relate to biodiversity loss and conservation; 6) measure the success/failure of current action strategies, such as Marine Protected Areas, by applying lessons learned and incorporation of emerging methods and data sources.

Contents

Processes of Marine Organisms and Systems, Primary Production in Marine Environments, Structure and Dynamics of Marine Communities, Functioning of Marine Ecosystems

Detailed program

Processes in Marine Ecosystem

Ecological and Evolutionary Principles of Marine Biology

Ecological interactions; Interactions on the scale of individuals; The population level; The community level: structure and interspecies interactions; The ecosystem level

The Chemical and Physical Environment

Measures of physiological performance; Temperature; Salinity; Oxygen; Light

Reproduction, Dispersal, and Migration

Ecological and evolutionary factors in sex; Reproduction, demography, and life cycles; Migration; Larval dispersal at different scales

Primary Production Process and Critical Factors in Plankton Abundance

Photosynthetic marine organisms; Light and photosynthesis; Patchiness of the plankton; The seasonal pattern of plankton abundance; Water column parameters and the spring diatom increase; Nutrients required by phytoplankton; Rate of nutrient uptake; Harmful algal blooms; Phytoplankton succession and the paradox of phytoplankton coexistence; Global trend of primary production; Measuring primary productivity; Zooplankton grazing in the sea

Systems in Marine Ecosystem

Seagrass Meadows

Morphology; Adaptations to marine life; Distribution, taxonomy and evolution; Factors affecting growth; Succession; Seagrass Ecology and Functions; Seagrass grazing; Decline of seagrasses and restoration

Mangrove Forests

Classification; Zonation; Adaptations and reproduction; Associated organisms; Functions and services; Impacts on mangrove forests

Coral Reefs

Coral polyp; Symbiosis with zooxanthellae and calcification; Coral growth and reproduction; Factors limiting the growth; Distribution of coral reefs; Coral reef development and types; Zonation; Biological interactions in coral reef ecosystem; Bioerosion and corallivory

The Water Column: Marine Vertebrates and Other Nekton

Cephalopods; Fish; Mammals; Marine birds and reptiles

Prerequisites

no

Teaching form

- Lessons: 4 credits

- Tutorials: 2 credits

During the COVID-19 restrictions the lessons will be recorded and available online, with some live events that will be planned and communicated on e-learning

Textbook and teaching resource

Lesson slides (power point presentations)

Textbook: Marine Biology: Function, Biodiversity, Ecology (3°edition). Jeffrey S. Levinton, Oxford University Press

Textbook: Marine Ecology: Processes, Systems, and Impacts (2° edition). Michel J. Kaiser et al., Oxford University Press

Scientific Papers

Semester

Period: first semester

Assessment method

Online Oral examination (18-30/30)

During the Covid-19 restrictions the oral exams will be exclusively through the WebEx platform. A public link will be posted on the e-learning page for the access of virtual public

Office hours

Monday 10.30-12.30

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