# COURSE DETAIL

## CLIMATE CHANGE IMPACTS ON COASTAL SOCIETY AND MARINE ECOSYSTEMS

**Country**
Italy

**Host Institution**
University of Bologna

**Program(s)**
University of Bologna

**UCEAP Course Level**
Upper Division

**UCEAP Subject Area(s)**
Environmental Studies Biological Sciences

**UCEAP Course Number**
189

**UCEAP Course Suffix**

**UCEAP Official Title**
CLIMATE CHANGE IMPACTS ON COASTAL SOCIETY AND MARINE ECOSYSTEMS

**UCEAP Transcript Title**
CLIMAT IMPCT COAST

**UCEAP Quarter Units**
6.00

**UCEAP Semester Units**
4.00

**Course Description**

This course is part of the Laurea Magistrale degree program and is intended for advanced level students. Enrollment is by permission of the instructor. Students will know the effects of global climate change on key organisms, biodiversity, and ecosystems, particularly on marine species, including the effects on human societies and economies. Models and forecasts are presented considering different scenarios predicted by the IPCC (Intergovernmental Panel on Climate Change). Students will know how organisms interact, as components of the structure and function of ecosystems, including the consequences of human interactions with the environment. Marine organisms are traced from the Earth's primordial oceans, to their response to the warming and acidifying oceans.

The course content is divided into two modules:

**MODULE 1:**

- **Conflicts and Security Risks of Climate Change in the Mediterranean Region** - Projections and Impacts of Future Climate Change in the Mediterranean; Impact of Climate Change on Water Supply and Water-Related Conflicts; Consequences for Food Security; Population and Migration in the Mediterranean; Human Security, Environmental Conflict and Climate Adaptation; Energy Security as Field of Conflict and Cooperation; Political and Economic Frameworks for Cooperation in the Mediterranean.
- **Socioeconomic Aspects: Human Migrations, Tourism and Fisheries** - Coastal Commercial Fisheries and Aquaculture; Tourism; Migrations.
- **Ecological and evolutionary considerations regarding corals in a rapidly changing environment -** Comments on the Evolution of Corals in the Atlantic Versus the Pacific Oceans; Climate Change, Changes in the Oceanic Climatic Zones, and Their Effects; Comments

on Evolution of the Immune System in Corals.

- **Coral population dynamics** - Ecological modes in corals; Why study population biology?; How to model population dynamics?; The introduction of an age-based population dynamics model into coral reef ecology: the Beverton and Holt model; The case study of mushroom corals at Eilat; Correlations between demographic characteristics, environmental parameters, and implications with climate change; Relationships between growth, population structure and sea surface temperature in temperate solitary corals; What about calcification and temperature?; What about non-zoox corals?; Zoox coral versus non-zoox coral; The Panarea underwater crater: a laboratory for the study of ocean acidification and warming effects; The ocean acidification; Calcifiers and ocean acidification; Coral biomineralization and calcification; The Panarea transplant experiment; Long term effects of acidification on growth of corals naturally living along a pH gradient.

**MODULE 2:**

- **Strategies of acclimatization to ocean acidification in Mediterranean corals** - The carbon dioxide volcanic vents of Ischia Island; Community shifts at Ischia Island; Impact of ocean acidification on the morphology of non-zooxanthellate corals; The problem of age determination in colonial organisms; Impact of ocean acidification on polyp and colony growth in non-zooxanthellate corals; Different acclimatization strategies to ocean acidification in zooxanthellate vs non-zooxanthellate corals; the impact of ocean acidification on coral-associate microbial ecosystems.

**Language(s) of Instruction**
English

**Host Institution Course Number**
88272

**Host Institution Course Title**
CLIMATE CHANGE IMPACTS ON COASTAL SOCIETY AND MARINE ECOSYSTEMS

**Host Institution Course Details**
https://www.unibo.it/en/study/course-units-transferable-skills-moocs/course-uni...

**Host Institution Campus**
BOLOGNA

**Host Institution Faculty**

**Host Institution Degree**
LM in SCIENCES AND MANAGEMENT OF NATURE

**Host Institution Department**
BIOLOGICAL, GEOLOGICAL, AND ENVIRONMENTAL SCIENCES

**Course Last Reviewed**
2025-2026

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