Climate change and marine ecosystems
Semester A

Time: 9 Lectures on Thursday afternoon (16:00-18:00), and a day trip to visit IOLR research facilities and the Shikmona shore.

Instructor: Prof. Gil Rilov

Communication: Via email (rilovg@ocean.org.il) or by appointment at the office in IOLR

Course Type: Lectures and a field trip

Course Level: BA third year, MA, MSc, PhD

Pre-Requisites: A background in biology is preferred

Course Overview:

Climate change driven by human actions is a major and growing threat to marine ecosystems globally, and our backyard, the Mediterranean Sea, is a major global change hotspot.

During the course, we will learn about the different types of threats caused by climate change including ocean warming, ocean acidification, increase in extreme events (such as heatwaves and storms), and sea level rise, and how they interact with other global pressures like bioinvasions to affect marine ecosystems.

Lectures will cover impacts on varied ecosystems from coral reefs, through kelp forests to polar regions as well as impacts on human resources like fisheries. They will also include examples from current research in the Israeli Mediterranean Sea, and specifically from work in my lab where we test the impacts of global change on species and communities living on rocky reefs using cutting-edge approaches and state-of-the-art experimental systems. We will also discuss modern approaches for testing the impact of multiple stressors on species and ecosystems. We will further address important questions such as (1) what is the future of our marine ecosystem under different future climate change scenarios? or (2) can we do effective marine conservation at the age of rapid climate change?

During the field trip to the National Institute of Oceanography of IOLR in Shikmona (on the Haifa coast), we will visit the rocky shore where we monitor and test biodiversity responses to seasonal dynamics and global changes, and visit the experimental facilities at IOLR (like mesocosms) where we test global change impacts on marine species and communities. In both the field and lab, you will get to know some of the native and invasive species that we use for testing the impact of climate change on the local biodiversity (some of the species will be discussed during the lectures) and be introduced to the methods we use to measure impacts.

Lecture list:

Date	Topic
2 November	Introduction: what is global change, and a general overview of marine ecosystems
9 November	Ocean warming and its ecological impacts
16 November	The complex effects of ocean acidification on marine organisms
23 November	The increase in extreme events (storminess and heatwaves) and how they lead to catastrophic ecological shifts
7 December	Bioinvasions as an expression of global change and their impacts on the Mediterranean Sea
21 December	Multiple stressors and why we should consider them
28 December	Planning multistressor experiments – the MEDDLE concept
4 January	Conservation challenges at the age of climate change

- Date of the field trip will be determined during the course

Evaluation method: Final exam (90%), active participation (10%)