ECTS : 4	**Structure and Function of Marine Ecosystems**
Project Manager : **Urania CHRISTAKI** Laboratoire de rattachement : Laboratoire Océanologie et de Géosciences (LOG), UMR-CNRS 8187 ; Université du Littoral Côte d'Opale, Maison de la recherche en Environnement Naturel, 32 avenue Foch, 62930 Wimereux	
Main Objectives	To acquire a global, but precise view of the structure, function, and evolution of marine ecosystems. To understand their basic features, in particular the complexity of pelagic and benthic processes, and the benthic-pelagic coupling in different types of marine ecosystems. To discover their complex trophic relationships, and understand the mechanisms underlying their operation. To position the functioning of marine ecosystems in a current context of global change through examples of pelagic ecosystem response to hydroclimatic forcing.
Contents	This unit introduces the key concepts of processes, relationships, and interactions between organisms covering all trophic levels (from viruses to fish). Lower trophic -levels : structure and processes of microbial communities at the base of ecosystem functioning (transformation of the organic matter, primary producers, viruses, bacteria, and autotrophic and heterotrophic protists in different types of pelagic ecosystems). Carbon flow in the pelagic food web Meso- and macrozooplankton: community structure, trophic modes, production, links with the lower and upper levels, and exotic and invasive organisms. Higher trophic levels- Fish: ecology, typology, and functioning of the nurseries. Analysis of natural and anthropogenic forcings. Trophic -Niche: generalization of trophic interactions and networking organization. Models of microalgae communities, benthic filter feeders, and fish communities. The Kelp forests: general distribution of kelp forests, ecology, biodiversity, food webs, and associated threats. Benthic invertebrate communities: trophic diversity and food webs of benthic communities, biological and chemical processes at the sediment-water interface (early diagenesic process, role of microorganisms in the regulation of the flow of elements, carbon budgets in the interfaces, and role the méio- and macrofauna) - Marine mammals, conservation and study. Finally, the EU is completed with an introduction to bioclimatologie through to examples of pelagic ecosystems hydroclimatic forcing (predator-prey interactions, latitudinal migrations.
Educational organization	40 lesson hours
Knowledge and skills acquired	Knowledge: -Gaining a fundamental comprehension of marine ecology and oceanography.Understanding thoroughly how different processes, community structure and ecosystem functioning are linked to each other and environmental factors. Skills: -Analyze the functioning of an ecosystem and its integral components (processes, structure, and diversity) - Judge the relevance of the scenarios relative to ecosystem response to those of biotic and abiotic forcing Additional Skills: - Make informed choices, and set priorities in an ecosystem study.
Considered professional activity	General and theoretical knowledge needed in marine ecology and oceanography to enter the world of research and / or ecosystem management.
Assessment methods	Written examination. The questions will be in English. The students can choose to answer in English or in French, but one single language should be used for all the answers.
Prerequisite acquired and recommended	Basic knowledge in biology and marine ecology. A comprehension of the English language.
Language of instruction	English
Teachers involved	Lille 1 : L. Denis, F. Gevaert, S. Lefebvre, N. Spilmont, V. Bouchet ULCO: R. Amara, U. Christaki, D. Vincent G. Beaugrand (CNRS)