Universitat Autònoma de Barcelona

2018/2019

Ecology

Code: 102802
ECTS Credits: 9

Degree	Type	Year	Semester
2501915 Environmental Sciences	OB	3	1

Contact

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Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Raul Garcia Valdes

Prerequisites

There are no official prerequisites. In any case, since it is a subject with transversal contents, it would be desirable that most of the subjects of previous courses had been passed.

Objectives and Contextualisation

The objective of this course is to provide the basic knowledge of ecology for a graduate in environmental sciences. The approach is of basic science, but the practical applications of the concepts discussed are also considered. There is a special emphasis on the quantitative aspects of ecology, so the student must use mathematical and statistical skills obtained in previous courses.

Content

The course is divided into four blocks. The **first block** is devoted to the study of individual species (populations) and their dynamics. Its main applications are in the field of conservation and management or exploitation of species. The **second block** considers all the species together (community) and asks, basically, why in some places or moments there are more species than in others, and how the species relate to each other. Its main applications are in the field of conservation. The **third block** also deals with communities, but here the interest is in their interaction with the physical environment, particularly in the exchange of matter and energy: biomass production, circulation of water and nutrients, ... Its main applications are in the field of sustainable management of environmental services provided by ecosystems and in the study of global environmental change. The **fourth block** consists of field practices that illustrate different aspects of ecology.

Block 1. Population dynamics

1. Introduction. What is ecology? Ecology within the environmental sciences. The importance of a quantitative approach. Humankind and nature.

2. How populations do grow? Basic demographic processes. Unlimited growth vs. density-dependent growth. Exploitation of populations.

3. We are not all equal: structured populations. Exponential growth with age-structure. Other structuring factors. Transition matrices.

4. Populations in space. Local populations and metapopulations. Local and regional extinction. Colonization. Metapopulation models. Conservation of populations.

5. We are not alone: inter-specific interactions. Competition, predation, and mutualism. Diffuse interactions. Indirect effects.

Block 2. Community ecology

6. The architecture of biodiversity. Diversity and biodiversity. Measurement of biodiversity. eDNA. Mutualistic and trophic webs. Keystone species.

7. The endless change: succession and perturbation. Models of succession. Perturbation regime. Intermediate disturbance hypothesis.

8. Communities in the space: biogeography. Communities and metacommunities. Species-are relationship. The model of McArthur and Wilson. The Hubbell's model.

9. Conservation of biodiversity. Past important extinctions. The current great extinction. Invasive species. Natural reserves. Assisted migration.

Block 3. Function of ecological communities

10. What are ecosystems? Matter and energy. Characteristics and structure of terrestrial and aquatic ecosystems. Models of compartments and flows.

11. Energy flow. Primary production. New and recycled production. Secondary production. Herbivores and detritivores.

12. Nutrient cycling. The hydrologic cycle. Transport of the main biological elements: C, N, P, and S. Differences between aquatic and terrestrial systems.

13. Global ecology. The main biogeochemical cycles in the Terrestrial Biosphere. Alterations: eutrophication, acid rain, global change. The Gaia hypothesis.

Block 4. Field work

- Forest biomass and production

- Gradient analysis in a coastal ecosystem