Universitat Autònoma de Barcelona

2020/2021

Ecology

Code: 101954
ECTS Credits: 6

Degree	Type	Year	Semester
2500890 Genetics	FB	2	1

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

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

Teachers

Miquel Riba Rovira

External teachers

Rafael Poyatos

Prerequisites

- There are no official prerequisites but it is convenient that the student has taken the optional subjects of Biology and Earth Sciences and the Environment in secondary school.
- It is also recommended that the student has achieved a minimum basic knowledge about Zoology, Botany, Mathematics and Statistics.

Objectives and Contextualisation

The course will focus on important aspects at the levels of organism, population, community and ecosystem, framed in five contexts:

1. Effects of ecological machinery: the environment acts on the life of the organism, modifies the expectations of survival and reproduction (phenotypic selection). The aspects of autoecology, the organism level, are the basic material to understand the distinction between soft and hard selection modes.

2. The different meanings of the concept of environment, which have conditioned our perspective to understand, ecologically and evolutionarily, the relationship between the environment and the organism. The basic attributes of the natural history of organisms will be presented, and summarized in the life strategies of classical K and r, which help to understand the great variation of biological cycles and their important components: duration of life, age of sexual maturity, etc.

3. The biological success that comes with a certain lifestyle, embodied in the concept of Darwinian fitness, can be modified by the accumulation of individuals. The level of complexity of the population is then treated. Vital

statistics, summarized by demography, change withthe populations size (and their spatial distribution) and prelude the introduction of the idea of soft selection, or selection at the local level.

4. The study of the numerical changes of the populations and their causes (population dynamics) are the basis of the change of allelic frequencies, and the possibility of evolutionary change. The speed of growth of a population is determined by the availability of resources and their types, so that the population growth models will be described. As every organism during its life can be seen as a resource by another organism, there appear several types of binary interactions, and more complex, which are summarized in mutualism, competition, depredation, parasitism and misfortune. The general essence of the type of interaction will be addressed, which requires an approach essentially based on equations, understanding will be carried to an advisable level.

5. The persistence of a species in the long term may also depend, in part, on how the transmission of individual attributes, to the next generations (natural selection,) is carried out, which, in turn, may be conditioned by how the population is configured in the spatial context, either as a population distributed continuously or distributed in a spatial mosaic of local populations of variable size and extension. For this, basic aspects of the ecology of dispersion and migration, and some of the processes that hinder them (fragmentation of habitats and "impermeability" of the ecological matrix) will be considered.

Finally, the reasons for the unequal distribution of the organisms abundances and the number of populations, in a given geographic area, correspond to the level of complexity of the communities. The central idea at this level is diversity, and the main hypotheses to explain the genesis of (high) diversity will be described. A synoptic view of biodiversity and its more social relevance will be given.

Competences

- Apply scientific method to problem solving.
- Be able to analyse and synthesise.
- Be sensitive to environmental, health and social matters.
- Describe the diversity of living beings and interpret it evolutionally.
- Recognise and structurally and functionally describe the different levels of biological organisation, from macromolecules to ecosystems.
- Use and manage bibliographic information or computer or Internet resources in the field of study, in ones own languages and in English.

Learning Outcomes

1. Apply scientific method to problem solving.
2. Be able to analyse and synthesise.
3. Be sensitive to environmental, health and social matters.
4. Explain how the different levels of biological organisation integrate in ecosystems.
5. Interpret the biological cycles of animal groups.
6. Recognise the complexity of the global dynamics of natural systems on their different scales of analysis.
7. Use and manage bibliographic information or computer or Internet resources in the field of study, in ones own languages and in English.

Content

Theoretical contents, unless the requirements enforced by the health authorities demand a prioritization or reduction of these contents.

1. Introduction to Ecology
2. Ecology and evolution
3. Response of organisms to environmental factors
4. Populations: basic demographic concepts and processes
5. Population dynamics
6. Interactions between species

7. Composition and structure of communities
8. Dynamics of communities - Succession and Disturbance
9. Trophic networks and trophic levels
10. Functioning of ecosystems
11. Global change

Methodology

Various teaching-learning strategies will be combined so that the student has a particularly active role during the entire training process:

1) Magister classes. The lectures represent the main activity to be done in the classroom and allow to transmit basic concepts to a large number of students in a relatively short time. They will be complemented with Power Point presentations and diverse didactic materials that will be delivered to the students mainly at the beginning of the course.

2) Seminars / classroom practices. They are work sessions by groups with a small number of students, based on questions or exercises delivered for their realization in class. In these sessions we will work around case studies. In this methodology, the teacher has a leading role, through questions that encourage reflection and debate among students, without transmitting all the information about the topic to be discussed.

3) Delivery of works and correction of seminars and classroom practices. The works delivered will be the subject of presentation, orientation, monitoring and correction in group, and these tutorials will also serve to solve the particular doubts of the students.

*The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Master classes	29	1.16	3, 4, 6, 2
Seminars / classroom practices	15	0.6	1, 2, 7
Type: Autonomous			
Study	73	2.92	
Text reading	26	1.04	2, 7

Assessment

Two evaluation modules are established:

1. Theory exams: 50% of the overall score, distributed in two partial exams.
2. Delivery of individual or group work on directed readings, exercises and case studies: 50% of the overall score.

Given the weight in the individual evaluation of the theory exams, a minimum global theory grade of 3.5 / 10 will be required to pass the subject, independently of the marks obtained in the two evaluation criteria. Likewise, a minimum grade of 3.5 / 10 will be required in any of the partial exams to pass the theory part.

The theory module can be re-evaluated with a specific recovery exam at the end of the course. This recovery exam will include the whole theory agenda, not segregated by partial exams. The qualification obtained in the recovery exam cancels the qualifications of the partial ones.

Students who wish to do so can also participate in the recovery exam at the end of the course to improve their qualification. The conditions are the same as for students who recover suspended qualifications.

To participate in the recovery exam, students must have been previously evaluated in a set of activities, the weight of which equals a minimum of two thirds of the total qualification of the subject or module. Therefore, the students will obtain the "Not Valuable" qualification when the evaluation activities carried out have a weight lower than 67% in the final grade.

A student will obtain the grade of "Not Evaluable" when the evaluation of all the evaluation activities that he / she has carried out does not allow to reach the global grade of 5.0 in the case if he / she had obtained the maximum grade in all of them.

*Student's assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Individual evaluation on the understanding and synthesis of directed readings and case studies	50%, the weight of specific activities is variable depending on the complexity of the suggested learning task	1	0.04	1, 6, 2, 7
Theory exams: 2 partial exams	50%: divided equally between both partial exams	6	0.24	1, 3, 4, 5, 6, 2, 7

Bibliography

Begon M., Townsend, C.R. & Harper, J.L. (2006). Ecology: From Individuals to Ecosystems (4th Edition). Blackwell, Oxford

Ricklefs R.E. (2010). The Economy of Nature. W.H. Freman, New York

Piñol J. & Matrínez-Vilalta J. (2006). Ecología con Números. Lynx Edicions, Bellaterra

Other recommended books:

Vandermeer J.H. & Goldberg D.E. (2013). Population Ecology: First Principles (2nd edition). Princeton University Press, Princeton, New Jersey

Townsend C.R., Harper J.L. & Begon M. (2003). Essentials of Ecology (2nd Edition). Blackwell Science, Oxford

Ricklefs R.E. & Miller G.L. (2000). Ecology (4ª ed.) W.H. Freeman & Co., New York.

Krebs C.J. (2001). Ecology: The Experimental Analysis of Distribution and Abundance (5ª ed.). Benjamin-Cummings Publishers Co.

Pianka E.R. (2000). Evolutionary Ecology. 6th. ed. Addison Wesley Longman, San Francisco.