

**COURSE DATA****Data Subject**

Code	33059
Name	Biogeography
Cycle	Grade
ECTS Credits	5.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. Period
1100 - Degree in Biology	Faculty of Biological Sciences	4 First term

Subject-matter

Degree	Subject-matter	Character
1100 - Degree in Biology	15 - Complements of biodiversity and conservation	Optional

Coordination

Name	Department
MESQUITA JOANES, FRANCESC	275 - Microbiology and Ecology

SUMMARY

The Biogeography module deals with the distribution of organisms, taking into account how they can become integrated on the geographical areas they occupy. This aspect involves the discussion of dispersal and colonization as main processes explaining distribution in varied geographical settings. Altogether, permanence depends on intrinsic and extrinsic organismic traits that act through the above mentioned processes and, consequently, these characteristics are also discussed. In addition, the distribution of organisms also depend on historical reasons, because their presence or absence in particular geographic regions is related to their area of origin and, in some cases, its present space occupation results from extinction in other areas. Therefore, geographic origin and extinction processes are also discussed in this module. The distribution of organisms is usually presented using cartographic tools, which are also presented here, but particularly linked to the dynamics of distribution areas, as these are not static through time, but related to expansions or reductions in occupied space.



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Since the presence of organisms in a particular geographic region depends on the abiotic and biotic environment in which it is immersed, it is necessary to know about how organisms are able to adapt to their environment. This process involves responses to the physical and chemical environment and to other organisms sharing this habitat. Consequently, basic knowledge of ecology, zoology, botany and evolutionary biology are essential.

OUTCOMES

1100 - Degree in Biology

- Capacidad de análisis, síntesis y razonamiento crítico.
- Capacidad de organización, planificación y gestión de la información.
- Utilización del lenguaje científico oral y escrito.
- Capacidad de resolución de problemas y toma de decisiones.
- Habilidad para el trabajo en equipo y en contextos multidisciplinares.
- Capacidad de análisis crítico de textos científicos.
- Apreciación del rigor, el trabajo metódico, y la solidez de los resultados.
- Capacidad de utilización de herramientas matemáticas y estadísticas.
- Saber analizar datos usando herramientas estadísticas apropiadas.
- Conocer las interacciones entre especies.
- Conocer los patrones de distribución geográfica de los organismos y sus causas.
- Realizar cartografías temáticas.

LEARNING OUTCOMES

Properly handle computing and bibliographic tools needed to access the main sources of biogeography.

Ability to analyse data, choose appropriate methods, critically evaluate and interpret experimental results in any of their expression ways.

To construct synopsis and critics from reading and understanding scientific texts.



Ability to use oral presentations in front of a public auditory and explain and debate on a polemic question or topic.

To know the use of basic laboratory scientific instruments in Biology.

To know the basic field tools and general concepts on data gathering and sampling.

Soundness in basic biogeographic knowledge.

To get familiar with technics used in studying processes and patterns in biogeography.

Ability to detect biogeographic patterns in fragmented environments.

Ability to compare different samples and environments.

Use theoretical models applied to real data and recognise the fit (or its lack) of real data to models.

SOCIAL ABILITIES.

To develop abilities for critical thinking, promoting communication and discussion of contents in order to stimulate individual creative capacity.

Ability to work in a team when facing to difficult situations in a collective approach.

Ability to argue from rational criteria, differentiating clearly what is an opinion from what could be a fact or accepted scientific evidence.

Ability to interact both with professors and companion students. Interest for the social and economic application of science and for scientific vulgarisation and the implications of scientific knowledge for culture and social conscience.

Professional capacitation. Acquisition of scientific and technical knowledge related to Biology that would allow developing professional and civic responsibilities in a society under continuous technological growth.

Ability to solve problems related to biogeography: distribution and conservation of organisms.

Ability to choose appropriate work methods and techniques.

Propose solutions to environmental problems such as habitat fragmentation.

DESCRIPTION OF CONTENTS

1. Introduction

1.The science of biogeography. History of biogeography (1.0 hour)



2. Patterns

2. Influence of the physical environment. Distribution of species and ecosystems (4 h)

3. Processes

3.1. Dispersal and colonization. Types of dispersal, barriers and corridors. Establishment and spread.

3.2. Speciation and extinction. Types of speciation in space. Diversification. Microevolution and macroevolution.

3.3. Palaeogeography, palaeoclimatology and biogeographical dynamics. Continental drift. Biotic interchange. Glaciations and biogeography. Refugia. Extinction of the Pleistocenic megafauna.
(5 h)

4. Evolutionary biogeography

4.1. Endemism, provincialism and disjunction.

4.2. History of lineages. Reconstruction of biogeographical histories.
(4 h)

5. Ecological biogeography

5.1. Island biogeography: patterns of species richness. Island biogeography: patterns of assembly and evolution of insular communities.

5.2. Macroecology. Areography. Ecogeographical rules.

5.3. Species diversity in marine and continental habitats. Continental patterns and processes.
(5.0 h)

6. Conservation biogeography

6. The state of biodiversity. Applied biogeography to species conservation. (2 h)



WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	24,00	100
Laboratory practices	18,00	100
Tutorials	6,00	100
Computer classroom practice	2,00	100
Development of group work	4,00	0
Development of individual work	16,00	0
Study and independent work	8,00	0
Readings supplementary material	10,00	0
Preparation of evaluation activities	20,00	0
Preparation of practical classes and problem	10,00	0
Resolution of case studies	5,00	0
Resolution of online questionnaires	2,00	0
TOTAL	125,00	

TEACHING METHODOLOGY

The module consists of a mixture of theoretical and practical contents. The practical activities will attempt to be developed in the Monfragüe National Park. It will consist on the recognition of living organisms and tabulation and analysis of collected data. In addition, some informatics lab practicals will be carried out.

EVALUATION

The student knowledge will be evaluated taking into account both practical and theoretical aspects. Theoretical concepts account for 75 % of the final marks, while practical knowledge account for 25%. This last part will include the development of practical work, solving problems and works derived from the described tasks. The theoretical part includes knowledge acquired during theoretical, informatics and tutoring classes so as seminars, and could also include texts suggested by the professor and/or discussed in the class. The theory will be evaluated first with a test which will account for 25% of the total marks, but it will be selective (i.e., only those students with a mark of 4 or higher over 10 maximum points in the test will be evaluated for the whole of the topics in the other parts, otherwise, they will need to pass the test in the second call). Another 10 % will be obtained from the continuous evaluation activities (e.g. exercises, comments, questions) and participation suggested by the professor during classes, and carried out, individually or in groups, depending of each case, by the students. The rest of the theoretical part, accounting for 40% of the final marks, can be evaluated either with a written exam including open questions, or with an oral presentation including questions by the professors on different aspects of the presentation and the theory. The practical part will be evaluated by means of an written essay based on the data collected by each student in the field work. It will be compulsory to obtain a minimum of 40% on



each part (theory and practical topics separately) to be able to calculate the final mark. Otherwise, the student won't be able to pass the subject, and the total mark will correspond to the minimum mark obtained in each of both parts (calculated on a maximum mark basis of 10 points). In any case, as detailed above, each student should get a minimum of 4 points over 10 in the test-type exam prior to the remaining evaluation process in order to get the final marks.

To request the advancement of the subject call, students must have completed the compulsory activities indicated in the course guide.

REFERENCES

Basic

- Ladle, R. & Whittaker, R.J., 2011. Conservation Biogeography. Oxford Univ. Press
- Lomolino, M. V. Riddle, B. R. and Whittaker, R. J. 2017. Biogeography, 5th Edition. Sinauer.
- Whittaker, R.J. and Fernández Palacios, J.M. 2007. Island Biogeography. Oxford Univ. Press

Additional

- Brown, J. H., 1995. Macroecology. University of Chicago Press, Chicago.
- Cox, C. B. & Moore, P. D., 1980. Biogeography: an ecological and evolutionary approach. Blackwell, Oxford.
- Fernández-Palacio, J. M. y Morici, C. (Editores). 2004. Ecología Insular. AEET y Excmo. Cabildo Insular de La Palma. Rumagraf
- Hengeveld, R., 1990. Dynamic biogeography. Cambridge University Press, Cambridge.
- MacDonald, G., 2003. Biogeography. Introduction to space, time and life. Wiley, NY.
- Meaza G. (Ed.), 2000. Metodología y práctica de la Biogeografía. Ediciones Serbal, Barcelona
- Myers, A.A. & Giller, P.S., (Eds.), 1988. Analytical Biogeography. Chapman & Hall, London.
- Rosenzweig, M. L., 1995. Species diversity in space and time. Cambridge University Press, Cambridge.
- Spellerberg, I. F. & Sawyer, J.W.D., 1999. An introduction to applied biogeography. Cambridge University Press, Cambridge.