

Academic Year/course: 2021/22

## 25225 - Management and conservation of flora and fauna

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 25225 - Management and conservation of flora and fauna

**Faculty / School:** 201 - Escuela Politécnica Superior

**Degree:** 571 - Degree in Environmental Sciences

**ECTS:** 6.0

**Year:** 3

**Semester:** Second Four-month period

**Subject Type:** Compulsory

**Module:**

## 1. General information

### 1.1. Aims of the course

The subject and the results presented respond to the following approaches and objectives:

- Offer a vision of the process of extinction of populations and species in the current era, and the main anthropic threats for living beings.
- Provide an overview of deterministic and stochastic processes - demographic, genetic or risk - natural resources that affect the conservation of species and small populations.
- Provide knowledge on the in situ and ex situ conservation programs of species, as well as on legislative measures adopted for the protection of living beings.
- Train students in the use of management tools for threatened species.
- Offer a historical perspective on the conservation of Spanish flora and fauna and draw a parallel of the species threatened by taxonomic groups.
- Encourage the habit of observation and analysis of biological diversity.
- Awareness of the need to conserve Iberian fauna and flora.
- Encourage research capacity in conservation biology.
- Know the fields of academic and professional application of Management and conservation of flora and fauna.

### 1.2. Context and importance of this course in the degree

The subject contributes knowledge of direct application in the exercise of the profession in fields related to the management and conservation of plants and animals, especially endangered species, and also others of interest ecological or economic (restoration, hunting, etc.).

### 1.3. Recommendations to take this course

This subject is offered in the [English Friendly](#) form

## 2. Learning goals

### 2.3. Importance of learning goals

The competences of this subject are relevant because they contribute to the basic and applied management processes and conservation of flora and fauna. They also imply the development in technical skills in reasoning, problem solving and critical thinking. As a training subject mandatory that is provides useful knowledge in other matters of the degree. It has application in the profession.

## 3. Assessment (1st and 2nd call)

### 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that they have achieved the learning results through the following assessment activities: Global face-to-face test at the end of the semester, which will consist of:

Theoretical section:

Written test on the basic knowledge of management and conservation of flora and fauna. It will consist of questions that require short answers (limited response tests) or that require a broad development of the topic (essay tests or free and open answer). There will also be questions in which the student will have to unify, contextualize and extrapolate what has been learned in the subject to real problems of management and conservation of plants and animals. The first type of question will allow a broad sampling of the student's knowledge on the subject, and the second and third type will allow to assess their ability to express, present and sustain arguments. The written test will be subdivided into two blocks: I, Flora Management and Conservation, and II, Fauna Management and Conservation. The written test will be based on the program of scheduled learning activities. Percentage in the final grade: 60%.

Practical section:

Preparation of the memory, exhibition and public defense of a practical work on a topic related to the Management and Conservation of Flora or Fauna.

The memory will be done in groups of 2 or 3 students or individually (depending on the number of students). This report must be prepared following the guidelines and the presentation format that will be marked in the program of the subject at the beginning of the course and that are reflected in the practical program of this teaching guide. The work will be presented and defended by each group of students in seminar-type sessions, in which the authors must argue and debate with the rest of the seminar participants (teachers and students). The time available for the presentation and defense of the topic during the seminar sessions will be 15 minutes. Percentage in the final grade: 15%.

Preparation in groups of a memory of the practice of the floristic inventory Percentage in the final grade: 5%.

Written test with problems and development questions in which the student will confirm what has been learned in the practical sessions, in the field trips and in the visits to the different conservation centers. Percentage in the final grade: 20%.

As indicated, the course will have a global assessment. Said test will be carried out in the official calls approved by the EPS. The test will evaluate 100% of the subject as follows: Theory written test 60% and the practical section written test 40%. However, the evaluation activities: Preparation of the memory, presentation and public defense of a practical work on a topic related to the Management and Conservation of Flora or Fauna (equivalent to 15%), Preparation of the memory of the inventory practice floristic (equivalent to 5%), and practical exam (equivalent to 20%) can be done (and so recommended) in practical sessions throughout the semester, at the request of students.

Final Grade Calculation, CF:

$CF = 60\% \text{ note written face-to-face test (theoretical part)} + 40\% \text{ practical part}$

If the minimum requirements are not met in the evaluation activities of the theoretical part (5 points out of 10) and the practical part (5 points out of 10), the course will not be considered approved although the final grade, CF, according to the average weighted is equal to or greater than 5. So, in that case, if:

$CF \geq 4$ , the final grade will be: Suspense, 4.

$CF < 4$ , the final grade will be: Suspense, CF.

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions and fieldwork.

### 4.2. Learning tasks

This course is organized as follows:

- **Lectures** (30 lectures, 50 minutes each). The teacher will explain concepts promoting students participation and interest in the subject.
- **Fieldwork** (from 10 to 20 hours) in natural areas with management programs of endangered species, or centers of flora and fauna conservation programs. 1 to 2 field trips with a duration of 10-20 hours (depending on the number of field trips). The aim of these field trips is to conduct an in situ examination of the conservational problems of endangered species, to know and discuss management strategies with those responsible for those actions and to develop critical thinking.
- **Practice sessions** (30 hours) and elaboration and oral exposition of a short seminar by students in the framework of the objectives of the course. Basic knowledge and principles of practical conservation will be given to complement the field trips. Also a brief endangerment species seminar will be given by students.

### 4.3. Syllabus

This course will address the following topics:

**Lectures**

## A) INTRODUCTION AND GENERAL CONCEPTS

? The conservation of species. Interest and framework for action. Conservation biology: empirical context and methods it uses.

? Notion of biodiversity. Levels of complexity. Brief advance of its geographical guidelines. Notions of biogeography.

? Demographics and population dynamics. Population growth models. Structured population models. Dynamics of small populations. Minimum viable population. Metapopulations.

? Population genetics applied to conservation. Genetic characterization. Population genetics. The Hardy-Weinberg equilibrium. Genetic drift and migration. Genetic diversity and structure estimates. Genetic relationships between individuals and populations and correlations with spatial distances. Genetic units relevant for conservation.

? In situ and ex situ conservation. International, Spanish and regional legislative framework. The IUCN Threat Categories. Red Books. Recovery plans.

## B) CONSERVATION AND MANAGEMENT OF PLANTS

? Plant biodiversity. Sources of scientific information on diversity: paleobotany, genetics and evolution, trees of life, phylogeny, molecular dating, geoclimatic changes, hybridization and speciation.

? Modeling of ecological niche. Dynamics of the range of the species. Fundamental niche and realized niche. Data and programs for niche modeling. Spatio-temporal projections of the niche. Niche modeling as a tool for conservation.

? Brief history of plant conservation. European regulations. The conservation of flora in Spain. Assessment of its status and threats. The Red Book and the Atlas of the Spanish endangered flora. The decentralization of management: competences and initiatives of the Autonomous Communities. The conservation of flora in Aragon.

## C) CONSERVATION AND MANAGEMENT OF FAUNA

? Specific wealth of the different groups. History of fauna conservation in Spain

? Problems of the conservation of invertebrates. Invertebrate Threatened Factors.

? Analysis of the lists of threatened Spanish invertebrates. Diversity and conservation.

? Problems of conservation of vertebrates. Specific Threat Factors. The legislation on vertebrates.

? Examples and cases of conservation and management of the main groups of vertebrates: Amphibians, Reptiles, Birds and Mammals

## Practice sessions

- Practice 0. What is a threatened species seminar?
- Practice 1. Wildlife sampling methods.
- Practice 2. Population size estimation.
- Practice 3. Spatial distribution.
- Practice 4. Biodiversity characterization.
- Practices 5-8. Seminars.
- Field Trip 9. Botanic inventory.
- Field Trip 10. Abiego-Ainsa-Revilla.

## Practice sessions

Seminar: The student or group of students will select a species of flora or fauna that is in some category of threat in the Iberian Peninsula and the assignment (report and defense) will be made up of at least the following parts:

- Systematic position (Kingdom/Division-Phylum/Class/Order/Family/Genus/Species)
- Synonyms
- Intraspecific taxa
- Number of species of the genus in the world
- Number of species of the genus in the Iberian Peninsula and the Balearic Islands
- Number of species of the genus in Aragon
- Number of genera of the family in the world
- Number of genera of the family in the Iberian Peninsula and the Balearic Islands
- Number of genera of the family in Aragon
- Morphological description of the species
- Area of distribution in the world, provinces of Spain and Aragon
- Number of populations and individuals
- Reproductive biology
- Habitat
- Cataloguing of conservation status in the General Council of Aragon and the Government of Spain
- IUCN Category in Spain. Specify points
- Threat factors
- Existing types of measures for protection/management/recovery (specific plans and protected spaces included in that) and appropriate proposals. Legislation of the General Council of Aragon (BOA, Official Aragon Bulletin).

#### 4.4. Course planning and calendar

Teacher's material, issues related to the subject, practice guides and other information relevant for the lecture will be published in ADD.

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences / Escuela Superior website and Moodle.

#### 4.5. Bibliography and recommended resources

- BB** Atlas y libro rojo de la flora vascular amenazada de España : taxones prioritarios / [editores y coordinación científica del proyecto, Ángel Bañares Baudet ... (et al.)]. Madrid : Tragsa : Ministerio de Medio Ambiente, 2003
- BB** Especies exóticas invasoras : diagnóstico y bases para la prevención y el manejo / autores, Laura Capdevila Argüelles ... [et al.]. Madrid : Organismo Autónomo Parques Nacionales, D.L. 2006
- BB** La diversidad biológica de España / coordinadores-editores, F.D. Pineda [et al.]. Madrid : Prentice Hall, D.L. 2002
- BB** Primack, Richard B. Essentials of conservation biology / Richard B. Primack. 6th ed. Sunderland (Massachusetts) : Sinauer Associates, cop. 2014
- BB** Primack, Richard B. Introducción a la biología de la conservación / Richard B. Primack y Joandomènec Ros. Barcelona : Ariel, D.L. 2002
- BC** Atlas de las aves reproductoras de España / realizado por la Sociedad Española de Ornitología (SEO-Birdlife) ; editores Ramón Martí y Juan Carlos del Moral. 1ª reimpr. Madrid : Organismo Autónomo de Parques Nacionales, 2004
- BC** Atlas de las plantas alóctonas invasoras en España / [editores y coordinación científica del proyecto] Mario Sanz Elorza, Elías D. Dana Sánchez y Eduardo Sobrino Vesperinas. Madrid : Ministerio de Medio Ambiente, Organismo Autónomo Parque Nacionales, 2004
- BC** Atlas de los mamíferos terrestres de España / Dirección General de Conservación de la Naturaleza, Ministerio de Medio Ambiente, Sociedad Española para la Conservación y Estudio de los Mamíferos (SECEM), Sociedad Española para la Conservación y Estudio de los Murciélagos ; L. Javier Palomo y Julio Gisbert (editores). Madrid : Organismo Autónomo de Parques Nacionales, 2002
- BC** Atlas y libro rojo de los anfibios y reptiles de España / [editores, J. M. Pleguezuelos, R. Márquez, M. Lizana ; coordinador del atlas, V. Pérez Mellado ; coordinadores del libro rojo, R. Márquez y M. Lizana]. Madrid : Organismo Autónomo de Parques Nacionales, 2002
- BC** Baskin, Y. (1997). The work of nature. How the diversity of life sustains us. Washington: Island Press
- BC** Caughley, G., Gunn, A. (1996). Conservation biology in theory and practice. Massachusetts: Blackwell Science
- BC** Devesa Alcaraz, Juan Antonio. Especies vegetales protegidas en España : plantas vasculares (Península Ibérica y Baleares) / por Juan Antonio Devesa Alcaraz, Ana Ortega Olivencia ; colaboradores Josefa López Martínez, Tomás Rodríguez Riaño. Madrid : Ministerio de Medio Ambiente, Organismo Autónomo de Parques Nacionales, D.L. 2004
- BC** Estrategia española para la conservación y el uso sostenible de la diversidad biológica. [1a. ed.]. [Madrid] : Centro de Publicaciones, Ministerio de Medio Ambiente, 1999
- BC** Fiedler, P.L., Jain, S.K. (2013). Conservation biology: the theory and practice of nature conservation, preservation and management. Springer
- BC** Galante, Eduardo. Los artrópodos de la ?Directiva Hábitat? en España / Eduardo Galante y José R. Verdú. Madrid : Organismo Autónomo Parques Nacionales, D.L. 2000
- BC** Given, D.R. (1994). Principles and practice of plant conservation. London: Chapman&Hall
- BC** Guía de invertebrados y peces marinos protegidos por la legislación nacional e internacional / editores, José Templado y Marta Calvo ; director técnico, Javier Pantoja. Madrid : Organismo Autónomo de Parques Nacionales, D.L. 2004

- BC** Hunter, Malcolm L. Fundamentals of conservation biology / Malcolm L. Hunter, J. Gibbs. 3rd ed. Malden, MA : Blackwell Publishing, 2007
- BC** Jeffries, Michael J. Biodiversity and conservation/ Michael J. Jeffries. 2ª ed. London : Routledge, 2005
- BC** Libro de la flora vascular rara, endémica o amenazada de la Comunidad Valenciana / Antoni Aguilera Palasí ... [et al.] ; dirección y coordinación, Emilio Laguna Lumbreras. València : Direcció General de Conservació del Medi Natural, 1994
- BC** Libro rojo de las aves de España / [realizado por la Sociedad Española de Ornitología (SEO/Birdlife) ; Alberto Madroño, Cristina González y Juan Carlos Atienza (editores). 1ª ed. Madrid : Organismo Autónomo Parques Nacionales, D.L. 2004
- BC** Libro rojo de los invertebrados de España / José R. Verdú, Eduardo Galante, editores. Madrid : Organismo Autónomo Parques Nacionales, 2006
- BC** Libro rojo de los vertebrados de España / Juan Carlos Blanco y José Luis González, editores. Madrid : ICONA, D.L. 1992
- BC** Mace, G.M., Balmford, A., Ginsberg, R. (2009). Conservation in a changing world. Cambridge: University Press
- BC** Meffe, Gary K. Principles of conservation biology / Gary K. Meffe, C. Ronald Carroll and contributors. 2nd ed. Sunderland, Massachusetts : Sinauer Associates, cop. 1997
- BC** New, T.R. (1995). An Introduction to invertebrate conservation biology. Oxford: University Press
- BC** Ramos, María Ángeles. Los invertebrados no insectos de la ?Directiva Hábitat? en España / Mª Angeles Ramos, Dolores Bragado y José Fernández. [Madrid] : Organismo Autónomo Parques Nacionales, D.L. 2001
- BC** Soulé, M.E., Orians, G.H. (2001). Conservation [biology:research](#) priorities for the next decade. Washington: Island Press
- BC** Spellerberg, I.F. (1996). Conservation biology. Essex: Longman/Pearson Education
- BC** Spellerberg, I.F. (2013). Evaluation and assessment for conservation: ecological guidelines for determining priorities for nature conservation. London: Chapman & Hall
- BC** Sutherland, J. (2008). Conservation science and action. Oxford: Blackwell Science
- BC** Watson, R.T., Heywood, V.H., (ed)(1995). Global biodiversity assessment. Cambridge: University Press
- BC** Wilson, Edward Osborne. La diversidad de la vida / Edward O. Wilson ; traducción castellana de Joandomènec Ros. Barcelona : Crítica, D.L. 1994

#### LISTADO DE URLs:

Blanca, G., et al. (1999). Libro Rojo de la Flora Silvestre Amenazada de Andalucía. Tomo I: Especies en Peligro de Extinción. Sevilla: Consejería de Medio Ambiente. Junta de Andalucía  
[\[http://digital.csic.es/bitstream/10261/42314/1/libro\\_rojo\\_flora\\_tomo1.pdf\]](http://digital.csic.es/bitstream/10261/42314/1/libro_rojo_flora_tomo1.pdf)

Blanca, G., et al. (2000). Libro Rojo de la Flora Silvestre Amenazada de Andalucía. Tomo II: Especies Vulnerables. Sevilla: Consejería de Medio Ambiente. Junta de Andalucía  
[\[http://www.biolveg.uma.es/links/libro\\_rojo\\_andalucia\\_tomo\\_ii.pdf\]](http://www.biolveg.uma.es/links/libro_rojo_andalucia_tomo_ii.pdf)

Especies Exóticas Invasoras: Diagnóstico y bases para la prevención y el manejo  
[\[https://www.aragon.es/documents/20127/674325/capdevilla.pdf/5947bd6b-f619-23d1-54a7-2d36104b5127\]](https://www.aragon.es/documents/20127/674325/capdevilla.pdf/5947bd6b-f619-23d1-54a7-2d36104b5127)

The updated recommended bibliography can be consulted in: <http://psfunizar10.unizar.es/br13/egAsignaturas.php?id=10983>