



COURSE DATA

Data Subject

Code	33099
Name	Management and conservation of species and habitats
Cycle	Grade
ECTS Credits	6.0
Academic year	2024 - 2025

Study (s)

Degree	Center	Acad. year	Period
1104 - Degree in Environmental Sciences	Faculty of Biological Sciences	3	First term

Subject-matter

Degree	Subject-matter	Character
1104 - Degree in Environmental Sciences	159 - Management and conservation of species and habitats	Obligatory

Coordination

Name	Department
LOPEZ LOPEZ, PASCUAL	275 - Microbiology and Ecology
MONROS GONZALEZ, JUAN SALVADOR	275 - Microbiology and Ecology

SUMMARY

The management and conservation of species and their habitats is a very important part of Conservation Biology. Conservation Biology, also called Conservation Science, is a multidisciplinary science that focuses on the study of nature and biological diversity with the aim of protecting species, their diversity at all levels, their habitats, ecosystems and the communities in which they live. Conservation Biology is a crisis discipline that tries to unite the interaction between ecological theory and other biological, physical and social sciences, as well as with the policies and practice of biodiversity conservation, in a multiscale field that goes from individual genetic diversity, intrapopulation diversity, to the biosphere as a whole, and postulates actions that can also take place at different spatial and temporal scales. The current extinction crisis, accentuated by the rapid changes linked to global change, is leading to the disappearance of part of the planet's biodiversity. In this global context, the Management and Conservation of Species and their Habitats deals with the phenomena that affect the maintenance and loss of biodiversity, as well as the processes that generate genetic, population, taxonomic and ecosystem diversity. Increasingly, the Management and Conservation of Species and their Habitats interacts with the eco-sociological framework in which these processes occur, and tries to provide a global response to the current



biodiversity crisis based on deep scientific knowledge, but also in an ethical attitude towards life.

The subject "Management and Conservation of Species and Habitats", corresponding to module VI "Conservation, Planning and Management of the Environment" of the Study Plan of the Degree in Environmental Sciences. The subject is articulated with the rest of the subjects of the module and with those studied previously in the first two years of the degree, so that the intensification, coordination and complementarity with the rest of the subjects allows the student to be given an integrated vision of the knowledge and to promote the necessary capacities to face the problem of the conservation of biological diversity in all its facets.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

To be enrolled in all subjects of the modules "General Scientific Basis" and "Scientific bases of the natural environment"

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

1104 - Degree in Environmental Sciences

- Conocimiento y capacidad de valoración de la importancia de los aspectos socioeconómicos en la gestión y planificación de los recursos naturales abióticos y bióticos.
- Capacidad para reconocer el estado e importancia de la biodiversidad y valorar sus principales amenazas.
- Conocer los conceptos, y capacidad para aplicar estrategias y modelos encaminados a la gestión y conservación de los recursos bióticos, al manejo de poblaciones y especies amenazadas, y de hábitats de interés prioritario.
- Capacidad para elaborar planes de gestión de poblaciones amenazadas de flora y fauna.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

1 Realization of practical works that imply the resolution of problems, the analysis of information and its critical interpretation in the context of the conservation of biological diversity, taking into account the socio-economic and legislative aspects of the decision-making process.



- 2 Preparation and presentation of short seminars on current issues in the field of biodiversity conservation, both individually and in small groups, involving bibliographic searches, integration of information in Spanish and English, analysis and synthesis of the same, oral presentation in public and defense and critical exhibition of it.
- 3 Use of bibliographic databases in electronic format, access to magazines and other publications in printed and electronic format on biodiversity and its conservation, as well as the use of at least one presentation computer program that allows the contents to be exposed to the rest of the student body.
- 4 Use of at least one computer program applied to population viability analysis (e.g., Vortex 10.0). Learn to interpret the results and apply them to practical cases of biodiversity conservation.
- 5 Application of ecological methods to situations that represent real cases in conservation biology. Making reports on applied cases in conservation of species and habitats.
- 6 Solving problems that involve taking qualitative and quantitative data in the field, the analysis of said data and its interpretation in a theoretical-practical context.
- 7 Knowledge and application of the main methodologies and tools (including computer tools) for the conservation of species, populations and ecosystems.
- 8 Carrying out studies, interpretation and analysis of projects on the management of species, populations or ecosystems.
- 9 Knowledge and assessment of the main strategies used for the management of species and habitats.
- 10 Management of basic methodologies and tools used in the management and planning of species and habitats within the current legislative framework both nationally and internationally.

DESCRIPTION OF CONTENTS

0. PRESENTATION OF THE SUBJECT

Teaching organization of the subject. Teachers, their profile; how to contact them. Teaching materials. Topics for work and seminars.

1. BLOCK I. CONSERVATION BIOLOGY: STATUS AND THREATS TO BIODIVERSITY

Theme 1. Biodiversity. What is biodiversity and why is it important? Components of biodiversity. How many species exist? Diversity of higher taxa. Diversity of communities. Diversity of ecosystems and biomes.

Theme 2. Patterns of biodiversity. Species richness throughout history. Patterns of endemism. Latitudinal gradients in species richness. Relationships between species richness and the energy available in the ecosystem. Disturbances and species richness.

Theme 3. Value of biodiversity. Green economy and direct economic values. Indirect economic values. Ethical values.



Theme 4. Extinction. Extinction episodes in the past. Cretaceous-Tertiary extinctions. Extinctions in the Permian. Man-made extinctions. Estimates of current extinction rates. Current threat patterns. Vulnerability to extinction. Conservation categories.

Theme 5. Threats to biodiversity. Major threats and their interactions. Habitat destruction, degradation and fragmentation. Overexploitation. Invasive species and diseases.

Theme 6. Biological impacts of climate change. Nature of climate change. Current and future climate change. Possible biological impacts. Observed biological impacts. Implications for conservation.

Item 7. Conservation genetics. Genetic variability. Forces affecting genetic variability. Conservation units. Application of genetics to species management.

Theme 8. Problems of small populations. Minimum viable populations and minimum dynamic area. Loss of genetic variability. Demographic stochasticity. Environmental stochasticity and catastrophes. Vortices of extinction.

Theme 9. Population ecology and population viability. Mechanisms for regulating populations. Metapopulations. Population viability analysis. Long-term population monitoring.

10 hours

2. BLOCK II. SOCIAL AND LEGISLATIVE CONTEXT OF CONSERVATION

Lesson 10. International approaches to conservation. International organizations. Non-Governmental Organizations (NGOs). Legislation and international agreements on biodiversity. Legislation and regulations of the European Union and state.

Lesson 11. Legislation of the European Union relative to habitats and natural spaces. The Habitats Directive. The Natura 2000 Network. Special Conservation Areas (ZECs), Sites of Community Interest (LICs) and Special Protection Areas for Birds (ZEPAs). Types of Natural Habitats of community interest. Priority habitats. State and Valencian Community legislation on habitats.

Lesson 12. Legislation of the European Union relative to the fauna. The Birds Directive of the European Union. State legislation related to fauna. Legislation of the Valencian Community regarding fauna. Wildlife reserves.

Lesson 13. State legislation relative to the flora. Legislation of the Valencian Community relative to the flora. Micro-reserves of flora. Flora Catalogs and Red Lists. Monumental trees.

(5 sessions)



3. BLOQ III. SPECIES MANAGEMENT AND CONSERVATION STRATEGIES

Item 14. Conservation status of plant species. Conservation status of Spanish flora. Main risks. Strategies for the conservation of flora. Management plans for the conservation of flora. Population analysis. Viable population planning and risk analysis. Translocation, reintroduction and reinforcement. Censuses and inventories. Case studies.

Item 15. Conservation status of animal species. Conservation status of Spanish fauna. Elements to consider to prioritize the conservation of fauna. Wildlife management in natural ecosystems. Mechanisms for biodiversity deterioration. Importance of conservation. Species of conservation interest. How a species is designed and conserved.

Item 16. In situ conservation. Introductory aspects. Techniques for maintaining genetic variation in managed populations. Translocation, reintroduction and reinforcement of individuals for the maintenance of populations. Measures to support the species in situ, handling of the biological community and other measures.

Item 17. Ex situ conservation. In situ versus ex situ conservation. Zoological nuclei. Vegetative conservation. Seed Conservation: Seed Banks. In vitro conservation. Pollen collections. DNA banks.

Theme 18. Introduction and basic principles of habitat management. Habitat management. Key resources. Community conservation. Community structure and species interaction. Temporal changes. Management plans.

Theme 19. Management of aquatic habitats. Main aspects in the management of different aquatic habitats. Eutrophication and acidification Effects on the biodiversity and functioning of aquatic ecosystems.

Item 20. Management of terrestrial habitats. Main aspects in the management of different terrestrial habitats.

Theme 21. Ecological bases for the conservation of habitat types of community interest.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	36,00	100
Laboratory practices	15,00	100
Computer classroom practice	6,00	100
Tutorials	3,00	100
Attendance at events and external activities	2,00	0
Development of group work	10,00	0
Development of individual work	10,00	0
Study and independent work	20,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	3,00	0
Preparing lectures	20,00	0
Preparation of practical classes and problem	10,00	0
Resolution of case studies	10,00	0
TOTAL	150,00	

TEACHING METHODOLOGY**PRACTICAL SESSIONS****Field practices**

Field trips are an essential teaching resource in the subject. For its development, a close and varied geographical environment will be chosen in environments (e.g., coastal wetlands), in which certain aspects of the conservation of biological complexity will be addressed at its different levels of organization, covering both



biological and related aspects. with other environmental sciences, including the basic eco-sociological and legal aspects, as well as the application of the necessary techniques for it. They will be articulated with the practices to be carried out in the computer room. There may be both short-term outings (1 day), as well as somewhat longer ones (2 days), depending on the logistical availability and the development of the teaching program. The duration of the field practices is estimated at around 15 face-to-face teaching hours.

Informatics practices.

They will overlap with the field trips, once the course has advanced to facilitate the students' understanding of the concepts of the first block of the subject, especially with regard to the theoretical aspects addressed in Units 7, 8 and 9 of the subject. To do this, three sessions will be held in the computer room of the Faculty of Biology in which students will carry out a Population Viability Analysis (PVA) using the Vortex 10.x program. In this analysis, students will put into practice the concepts of extinction risk, environmental, demographic and genetic stochasticity, and aspects related to the dynamics of metapopulations applied to the field of conservation biology. Specifically, PVAs will be carried out based on real cases with species of conservation interest such as Bonelli's eagle (*Aquila fasciata*) and Audouin's gull (*Ichthyaetus audouinii*).



Attendance at the practice sessions is mandatory, and the teacher will take the roll call to verify it.

SEMINARS (INVITED AND GROUP PRESENTATION)

Throughout the course, three one-hour seminars will be held for guest speakers who can provide a practical point of view regarding the development of any aspect of the agenda, where students will be able to interact with researchers from other research centers as well as with professionals in the field of Environmental Sciences who carry out their professional activity linked to the field of management and conservation of species and habitats who work in the administration, in non-governmental entities or in the field of the private sector. Students must submit through the Virtual Classroom a brief summary of the exposed contents, their critical opinion and the relationship that the seminar has had with the theoretical contents of the subject.

GROUP TUTORING

During the course there will be three sessions of one hour of group tutoring. They will present and discuss various aspects related to the subject. In the first session, all the logistics of leaving the field practices will be explained. In the following two sessions, the teacher will either solve specific doubts that have arisen during the course of the subject or present a practical case as a question that may appear in the theory exam in which the students must present their reflections and critical view of the subject based on previously acquired knowledge. Attendance at tutorials is mandatory and the teacher will take a roll call to verify attendance.



PERSONALIZED TUTORING

The teacher will indicate an attendance schedule for the student, which they can use whenever they consider it necessary. Within this schedule it is planned that students, individually, can attend during the semester to resolve specific questions or doubts about the contents of the subject.

PREPARATION OF THE THEORY CLASSES

The time that the student must dedicate to the advance preparation of the theory sessions is counted here. The didactic material (projections and script of the topic) of each theory session will be available in the Virtual Classroom (<https://aulavirtual.uv.es/>) at least 48 hours before the session takes place.

STUDY AND EXAM PREPARATION



Student independent study.

CONDUCT OF EXAMS

A final test will be held at the end of the semester. This final test will include questions from the theoretical and practical parts of the subject. It will not be possible to have materials and notes in the execution of the exams except for a calculator. If necessary, the teacher will provide a form.

EVALUATION

MODE OF EVALUATION

1. Objective test consisting of a two-hour exam that will include multiple choice questions, short questions, development questions and problems seen in the computer sessions. The percentage of the final grade for this test will be 65%.
 2. Evaluation of the practical activities (i.e., tasks) based on the preparation of reports of computer practices, report of field practices, delivery of at least one summary of the seminars by invited speakers and the presentation of the group seminar . The percentage of the final grade for these tests will be 25%.
-
1. Continuous evaluation of each student, based on attendance, participation in class and degree of involvement in the teaching-learning process. The percentage of the final grade for these tests will be 10%.



The mark of the subject in each call will be global, calculated by adding the marks of the previous sections. To obtain the overall grade, the final exam must be passed with at least 50% of the maximum grade. For the rest of the sections (i.e., homework and attendance/participation) it may be averaged for the final calculation of the grade if the student has obtained at least 40% of the maximum grade.

In case of not passing the subject in the first call of the academic year, the marks of those parts of the subject (among the three outlined above) in which at least 50% of the score has been obtained will be saved for the second call. within the same academic year. In no case will any of these grades be saved for the

following academic year.

The notes that imply the assistance and delivery of a memory for its evaluation, will be qualified, both in the first and in the second call, if it has been attended. If they have not attended, they will be scored with zero points in the corresponding sections.

To request advance notice of this subject, students must take into account that they must have completed the compulsory activities indicated in the teaching guide for the subject.

REFERENCES

Basic

- Groom, M. J.; G. K. Meffe, and C. R. Carroll (2006). Principles of Conservation Biology. Third Edition. Sinauer Sunderland, MA.
- Hunter M.L. and J. Gibbs (2007). Fundamentals of Conservation Biology. Third edition. Wiley-Blackwell.
- Primack, R. B. y J. Ros. (2002). Introducción a la Biología de la Conservación. Ed. Ariel Ciencia. Barcelona.
- Primack R. B. (2006). Essentials of Conservation Biology. Fourth Edition. Sinauer Sunderland, MA.
- Sodhi, N. S. and P. R Ehrlich (2010). Conservation Biology for all. Oxford University Press, Oxford, UK.
- Van Dyke, F. (2008). Conservation Biology: Foundations, concepts, applications. Springer, New York.

**Additional**

- Adams, W. M. (2004). *Against extinction: The story of conservation*. Earthscan Publications, London.
- Ausden, M. (2007). *Habitat management for conservation: A handbook of techniques*. Oxford University Press, Oxford, New York
- Begon M.; C. R. Townsend and J. L. Harper (2005). *Ecology: from individuals to ecosystems*, Fourth Edition, Wiley-Blackwell.
- Clout M. N. (2009). *Invasive species management: A handbook of techniques*. Oxford University Press. Oxford, New York
- Davis, M. A. (2009). *Invasion Biology*. Oxford University Press, Oxford, UK.
- Ebenman B. and T. Jonson. (2005). Using community viability analysis to identify fragile systems and keystone species. *TREE* 20:568-575.
- Ferrière, E.; U. Dieckmann and D. Couvet, (2004). *Evolutionary Conservation Biology*. Cambridge University Press, Cambridge.
- Frankham, R.; J.D. Ballou, and D.A. Briscoe. (2010). *Introduction to conservation genetics*. Cambridge University Press, Cambridge.
- Gibbs, J.P.; M. L. Hunter, Jr., and E. J. Sterling (2008). *Problem-solving in Conservation Biology and Wildlife Management*. Second Edition. Wiley-Blackwell.
- Henry, R. (2006). *Plant conservation genetics*. Food Products Press.- Haworth Press, Binghamton, NY.
- Krebs C.J. (2009). *Ecology: the experimental analysis of distribution and abundance*. Benjamin Cummings, San Francisco.
- MacDonald, D. (2006). *Key topics in Conservation Biology*. Blackwell Publishing.
- Milner-Gulland E.J. (2007). *Conservation and Sustainable Use: A Handbook of Techniques*. Oxford University Press, Oxford, New York
- Mills, L. S. (2006). *Conservation of wWildlife populations*. Blackwell Science, Oxford, UK.
- Molles, M.C. (2006). *Ecología: conceptos y aplicaciones*. McGraw-Hill Interamericana.
- Peris Llopis, J. (2006). *Sistemas de Información Geográfica aplicados a la gestión del territorio*. Servicio de Publicaciones de la Universidad de Alicante. Alicante.
- Sinclair, A. R. E.; J. M. Fryxell, and G. Caughley. (2006). *Wildlife Ecology, Conservation and Management*. Blackwell Publishing.
- Van Andel, J. and J. Aronson (2005). *Restoration ecology*. Blackwell, Oxford.
- Walker, B.H., J.M. Anderies, A.P. Kinzig and P. Ryan (Eds.) (2006). *Exploring resilience in social-ecological systems: comparative studies and theory development*. CSIRO Press, Canberra, Australia.