Biodiversity, Land and Water

Academic Year: (2024 / 2025) **Review date: 23-04-2024**

Department assigned to the subject: Social Sciences Department

Coordinating teacher: TRAVIESO BARRIOS, EMILIANO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

OBJECTIVES

¿ Understand the crucial importance of biodiversity for human society
¿ Understand how biodiversity is structured in space and time.
¿ Understand how is measured biodiversity.
¿ Understand the concepts of diversity at different spatial scales and the existence of different levels of ecological organization (species, communities, ecosystems and landscapes).
¿ Understand species responses to human activities and global change.
¿ Identification and understanding of the main human-induced threats to the environment and biodiversity in terrestrial and aquatic ecosystems.

DESCRIPTION OF CONTENTS: PROGRAMME

1. The concept of biodiversity: definitions, value for human society, measurement, global spatial patterns.

2. Biodiversity loss: quantification, impact on ecosystem services, predictions of future loss, extinction rates.

3. Invasive species: drivers and impacts of biological invasions on society and biodiversity. Strategies to control invasive species.

4. Threats to biodiversity: habitat change, pollution, climate change, overexploitation.

5. Biological conservation (1): basic concepts, strategies of prioritization, design of conservation strategies.

5. Biological conservation (2): in-situ and ex-situ strategies, protected areas. Concepts of introduction, reintroduction, renforcement, de-extinction.

LEARNING ACTIVITIES AND METHODOLOGY

¿ Most of classes will be divided in two equally-parts. A theoretical session in which the teacher develops the most important elements of each topic and presents the crucial conceptual problems linked to the skills that students should acquire. Although the role of the students in these sessions is more passive, there are several instances in which discussion is proposed.

¿ In the second part of most classes, the teacher will propose practical exercises to students related to the topic under study. The group will be subdivided in a few working groups. Exercises will be either solving a problem, analyzing a paper, or reviewing a specific topic. These exercises will be sometimes followed by a brief presentation to the rest of the students.

ASSESSMENT SYSTEM

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

Presentations (individual or in teams) 25%
Assignments during the course (individual and/or in teams) 25%
Final exam 50%

BASIC BIBLIOGRAPHY

- Cain, M. L., Bowman, W. D., & Hacker, S. D. Ecology, Sinauer Associates, Incorporated., 2008

- Sodhi, N. S., & Ehrlich, P. R. (Eds.). Conservation Biology for all, 2010, Oxford University Press

- Taylor et al. Campell Biology: Concepts & Connections, Pearson, 10th edition

ADDITIONAL BIBLIOGRAPHY

- Almond, R. E., Grooten, M., & Peterson, T. Living Planet Report 2020-Bending the curve of biodiversity loss, World Wildlife Fund, 2020

- Bastin, J. F., Finegold, Y., Garcia, C., Mollicone, D., Rezende, M., Routh, D., ... & Crowther, T. W. The global tree restoration potential, Science, 365(6448), 76-79., 2019

- Bellard, C., Marino, C., & Courchamp, F. Ranking threats to biodiversity and why it doesn¿t matter, Nature Communications, 13(1), 1-4., 2022

- Ceballos, G., Ehrlich, P. R., Barnosky, A. D., García, A., Pringle, R. M., & Palmer, T. M. Accelerated modern human¿induced species losses: Entering the sixth mass extinction, . Science advances, 1(5), e1400253., 2015

- Des Roches, S., Pendleton, L. H., Shapiro, B., & Palkovacs, E. P. Conserving intraspecific variation for nature¿s contributions to people, Nature ecology & evolution, 5(5), 574-582., 2021

- Diagne, C., Leroy, B., Vaissière, AC. et al. High and rising economic costs of biological invasions worldwide, Nature 592, 571¿576, 2021

- Hulme, P. E., Bacher, S., Kenis, M., Klotz, S., Kühn, I., Minchin, D., ... & Vilà, M. Grasping at the routes of biological invasions: a framework for integrating pathways into policy, Journal of Applied Ecology, 45(2), 403-414., 2008

- IPBES Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, IPBES secretariat, 2019

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- Mora C, Tittensor DP, Adl S, Simpson AGB, Worm B How Many Species Are There on Earth and in the Ocean? , PLoS Biol 9(8): e1001127. , 2011

- Penn, J. L., & Deutsch, C. Avoiding ocean mass extinction from climate warming, Science, 376(6592), 524-526, 2022

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- Tilman, D., Clark, M., Williams, D. R., Kimmel, K., Polasky, S., & Packer, C. Future threats to biodiversity and pathways to their prevention, Nature, 546(7656), 73-81., 2017

- Tollefson, J. Humans are driving one million species to extinction, Nature, 569(7755), 171-172., 2019

- Zachos, F. E., & Habel, J. C. (Eds.) Biodiversity hotspots: distribution and protection of conservation priority areas, Springer Science & Business Media, 2011

BASIC ELECTRONIC RESOURCES

- IPBES .): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services: https://doi.org/10.5281/zenodo.3831673