Biodiversity and Conservation

Educational subject description sheet

Basic information

Field of study Joint Bachelor in Sustainability	**Education cycle** 2025/26
Speciality Environmental & Life Sciences	**Subject code** UJ.WPAJBSELSS.880.16546.25
Organizational unit Faculty of Law and Administration	**Lecture languages** english
Study level first cycle (joint degree programme)	**Subject related to scientific research** Yes
Study form full-time degree programme	**Disciplines** Biological sciences
Education profile General academic	**ISCED classification** 0521 Environmental sciences
Mandatory obligatory	**USOS code**

Subject coordinator	Piotr Szwedo
Lecturer	Jose Ignacio Aguirre, Leopoldo Garcia, Jose Raggio, Izabela Wierzbowska, Pradeep Divakar, Enrique Andivia

Period Semester 4	**Examination** graded credit **Activities and hours** Discussion class: 45	**Number of ECTS points** 5.0

Goals

C1	Basic knowledge of patterns related to biological and genetic diversity, their distribution, estimation, and relationship with abiotic variables
C2	Identification and description of impacts of global change on biodiversity.
C3	Description of processes of restoration and conservation of threatened ecosystems.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	the definition of biological diversity and can explain methods to measure it.	JBS_K1_W01, JBS_K1_W02	written credit, credit with grade
W2	how taxonomy is used in biodiversity studies and conservation efforts.	JBS_K1_W06	written credit, credit with grade
W3	the importance of sampling effort in biodiversity studies.	JBS_K1_W03, JBS_K1_W04	written credit, credit with grade
W4	International Frameworks for Sustainability to understand the role of international agreements and organizations in addressing global sustainability challenges.	JBS_K1_W05	written credit, credit with grade
Skills – Student can:			
U1	design effective sampling strategies for biodiversity assessments	JBS_K1_U03, JBS_K1_U04	credit with grade
U2	collect and analyse biodiversity data	JBS_K1_U03	credit with grade
U3	how to use GIS tools for analysing and mapping biodiversity data.	JBS_K1_U04	credit with grade
Social competences – Student is ready for:			
K1	to develop critical thinking skills to assess their own competencies and identify areas for improvement related to sustainability	JBS_K1_K04	credit with grade
K2	to emphasize the importance of scientific data and methods for informed decision-making in matters related to biodiversity and conservation.	JBS_K1_K05	credit with grade

Calculation of ECTS points

Activity form	Activity hours*
Discussion class	45
problem analysis	45
preparation for final test	35
preparation for classes	25

Student workload	Hours	ECTS
	150	5.0

* hour means 45 minutes

Study content

No.	Course content	Subject's learning outcomes
1.	Biological diversity: definition and measurement, quantitative and qualitative measurements of biodiversity. / Lecture-practical	W1
2.	Biological diversity: species definition, taxonomy applied to biodiversity and conservation. / Lecture-practical	W1, W2
3.	Biological diversity: Sampling design, data collection, sampling effort. / Lecture-practical	W3, U1, U2
4.	Biological diversity: Geographical Information Systems. / Lecture-practical	W4, U2, U3
5.	General patterns of biodiversity distribution: Terrestrial and marine distribution of biodiversity. Main biomes of the world. / Lecture-practical	W1, W2
6.	General patterns of biodiversity distribution: mapping ecosystems: Biogeography and Bioclimatology / Lecture-practical	W1, W2, W4, U1, U2
7.	General patterns of biodiversity distribution: Biodiversity properties (Biodiversity vs area; Biodiversity vs temperature; Biodiversity vs precipitation; Biodiversity vs ecosystem productivity, resilience, and stability) / Lecture-practical	W2
8.	Conservation genetics: Genetic biodiversity, Population genetics, Germplasm conservation / Lecture-practical	W1
9.	Impacts of the global change drivers on biodiversity: Climate Change Land use Changes (Habitat fragmentation, habitat loss.), Nitrogen deposition (Eutrophication)/ Lecture-practical	W1, W2, W3, U1
10.	Impacts of the global change drivers on biodiversity: Overexploitation Pollution (Toxicity), Macro- and microplastic, invasive species. / Lecture-practical	W1, W2, W3, U1
11.	Recovery, conservation, and management of threatened ecosystems & species: Mapping, demography, and IUCN categories, CITES, International, governmental and non-governmental organizations involved in conserving and restoring ecosystems and biodiversity, international conventions on biodiversity. / Lecture-practical	W1, W2, W3, U1, U2
12.	Recovery, conservation, and management of threatened ecosystems & species: Extinction process. / Lecture-practical	W1, W3, U1
13.	Recovery, conservation, and management of threatened ecosystems & species: Reintroduction and recovery planning (ecological restoration), In situ, ex situ conservation, the role of protected areas. / Lecture-practical	W1, W2, W3, U1, U2, U3, K1, K2
14.	Recovery, conservation, and management of threatened ecosystems & species: Different conservation concepts: focus in species vs. focus on ecosystems. / Lecture-practical	W1, W2, W3, U1, K1, K2
15.	Recovery, conservation, and management of threatened ecosystems & species: Sustainable land use vs. full protection. / Lecture-practical	W1, W2, W3, U1, K1, K2

Course advanced

Teaching methods :

text analysis, brainstorming, conversation lecture, lecture with multimedia presentation, discussion, case study, gamification

Activities	Examination methods	Credit conditions
Discussion class	written credit, credit with grade	Active participation, written test based on open questions (60%). Assignment – practical case to be solved over the length of the course (40%).

Entry requirements

None

Literature

Obligatory

1. Frankham R, Ballou JD, Briscoe DA (2010) Introduction to Conservation Genetics. Cambridge University Press, 2nd edition. ISBN-10: 0521639859.
2. Gaston KJ, Spicer JJ (2004) Biodiversity. An introduction. Blackwell. Oxford. ISBN 1405118571.
3. Groom MJ, Meffe GK, Carroll CR (2006) Principles of Conservation Biology. 3ª ed. Sinauer. Sunderland. ISBN-10:0878935185.
4. Hunter M, Gibbs JP, Popescu VD (2021). Fundamentals of Conservation Biology. 4th edition. Wiley-Blackwell. ISBN: 978-1-119-14416-8.
5. Kareiva P, Marvier M (2010) Conservation Science: Balancing the Needs of People and Nature. Roberts-publishers.
6. Primack RB, Sher A (2016) An Introduction to Conservation Biology. Sinauer. ISBN-10: 9781605354736.
7. Pullin AS (2002) Conservation Biology. Cambridge University Press.
8. Sher A (2022) An Introduction to Conservation Biology. Sinauer, 3rd Edition. ISBN-10: 0197564372.
9. Sodhi NS, Ehrlich PR (2010) Conservation Biology for all. Oxford University Press. Oxford. ISBN-10: 0199554242.
10. Spellerberg IF (2005) Monitoring Ecological Change. Cambridge University Press. Cambridge. ISBN-10: 0521820286.
11. Sutherland WJ (2000) The conservation handbook: research, management and policy. Blackwell. Oxford. ISBN-10:0632053445.
12. Van Dyke F, Lamb RL (2020) Conservation Biology. Foundations, Concepts, Applications. Springer 3rd ed. ISBN-10: 3030395324.

Effects

Code	Content
JBS_K1_K04	The graduate can critically assess and verbalize own competencies and skills related to different aspects of sustainability as well as their need for development.
JBS_K1_K05	The graduate can defend the importance of scientific data and methods as a basis for decision-making.
JBS_K1_U03	The graduate can apply adequate methods and tools, including selected IT tools, to solve problems related to data collection, analysis, and management in the context of sustainability.
JBS_K1_U04	The graduate can plan and effectuate simple sustainability-related projects under supervision and in the context of personal lifelong learning, both individually and in a team, using appropriate transversal skills and taking shared responsibility for the outcome.
JBS_K1_W01	The graduate can describe the concept of sustainability and recognize the differences in relevant definitions, models and approaches.
JBS_K1_W02	The graduate can explain the axiological background of sustainability and summarize key stages of development of the concept.
JBS_K1_W03	The graduate can give examples of sustainability-related dilemmas and hypothesize on the optimal course of action.
JBS_K1_W04	The graduate can identify sustainability-related problems specific to selected cultural, geographical, and political contexts.
JBS_K1_W05	The graduate can identify essential international instruments and institutions related to sustainability and explain their potential role in resolution of a given problem.
JBS_K1_W06	The graduate can describe interconnections between various aspects of sustainability and identify their significance in the context of natural and social sciences, with a special focus on disciplines included in the selected specialisation track (law and politics; chemistry and physics; chemistry and biology; economics and geography; economics, management and engineering; humanities).