Universidad Zaragoza

Academic Year/course: 2023/24

25268 -

Syllabus Information

Academic year: 2023/24
Subject: 25268 -
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 571 - Degree in Environmental Sciences
ECTS: 6.0
Year:
Semester: Second Four-month period
Subject type: Optional
Module:

1. General information

The general objective of the subject is to obtain knowledge of the functioning of aquatic ecosystems , mainly epicontinental, that will allow addressing the necessary actions for their management, conservation and restoration, within the framework of current regulations. This will allow: a)to approach the scientific study of aquatic systems;

b) to apply techniques, tools and protocols for the evaluation of the environmental integrity of aquatic ecosystems according to current regulations, biotic ecological quality indexes such as those of macroinvertebrates (IBMWP, etc.)

c) to develop professional, scientific and social skills in relation to the challenges of conservation and management of water and aquatic ecosystems

Special attention will be given to the Sustainable Development Goals: ODS 4, 6, 7, 12, 14, 15

In order to better follow the subject, it is recommended to have passed Ecology I and II.

It is also advisable to have passed the subjects of Botany and Zoology, Biology, as well as those related to basic sciences

2. Learning results

- Describe and argue the ecological functioning (physico-chemical, biological processes...) of the different aquatic systems
- Identify the relationships established between the levels of the trophic chain in different aquatic ecosystems
- Demonstrate proficiency in the use of the main methodologies for sampling, determination, and analysis of organisms from aquatic ecosystems for their application in ecological quality and trophic status indices.
- Express aquatic ecology ideas and concepts correctly orally and in writing.
- Identify and describe the main impacts affecting aquatic ecosystems.

These learning results are aligned with SDGs 4, 6, 7, 12, 14 and 15. With their achievement, the students will have acquired the theoretical and practical knowledge necessary to promote sustainable development in relation to aquatic ecosystems.

3. Syllabus

1.	Introduction. Role of aquatic ecosystems in ecology.
2.	Distribution, abundance and availability of the most important elements for life. Factors, resources and by-products in the activity of organisms in the ecosystem. Autoecological constraints to abundance: resources and factors. Nutrient dynamics. Importance of the vertical axis in the organization in space of the materials cycle.
3.	River systems. Abiotic factors. Biological characteristics: Primary producers. Consumers. Biological traits. The "river continuum concept". Mediterranean rivers. Impacts.
4.	Lake systems. Structure and organization. Main abiotic factors. Trophic state.Main organisms. Main biological traits. Transitional and shallow waters(wetlands and marshes). Differentiating characteristics. Water regime. Trophic network. Causes of degradation and eutrophication.

5.	Reservoirs. Structure, operation and distribution of organisms. Changes in taxonomic and functional diversity in the transition from river to lake.
6.	Oceanic system. Organization. Littoral, pelagic and benthic ecosystem. Nutrient dynamics.Estuaries, upwellings-Ocean circulation anomalies. Marine food webs. The organisms of the plankton and benthos. Main biological traits.
7.	Water Framework Directive. Recognition of the typologies of water bodies according to Royal. Decree 817/2015. Ecological status categories. Prioritization of indicators and decision-making.

4. Academic activities

Theoretical sessions in the classroom: 30h

Practical sessions:

--Case study: reading, summarizing and presenting a scientific article.

-Primary production and predation. Importance of bottom-up and top- down controls in planktonic food webs. In situ experiment.

--Quality of river courses. Ecological status indices: macroinvertebrates and chlorophyll.

-Census of populations in the wild. The effect of protection on marine aquatic ecosystems.

-Visit to aquatic ecosystems affected by a restoration project.

Field trips: 15h

There will be 3 field trips in which organisms will be observed, in situ experiments will be carried out and samples will be taken, which will later be analysed in the laboratory. These trips will include a visit to river, a lagoon and a marine reserve.

Laboratory: 15h

A script of the practice is provided with the face-to-face and non-face-to-face activities to be carried out.

In relation to the SDGs, all the learning activities of the subject allow to achieve the learning results related to them .

5. Assessment system

This subject offers the possibility of continuous evaluation, for which it is recommended to attend at least 80% of the face-to-face activities.

The continuous evaluation activities will be:

- Written test at the end of the program of theory and practices of the subject. The test may include multiple-choice, short-answer and essay questions. Practical and theoretical contents of the subject will be evaluated (70% of the grade).
- Elaboration of a report of each practice (25%). The report of each practice will be done as a group.
- Analysis and presentation of scientific papers (5%). Analysis, summary and exposition, individually, of a scientific text related to the syllabus.

The global evaluation test will consist of the following activities:

- General report including the exercises proposed in the set of practices (15%).
- Written and face-to-face test on the contents of the practices (15%)
- Written and face-to-face test at the end of the term according to the PS exam calendar (70% of the grade). Each test may include multiple-choice, short-answer and essay questions. It will include practical and theoretical contents of the subject.

Both in the continuous evaluation and in the global evaluation, it will be necessary to obtain a minimum grade of 5 in each of the blocks (theoretical and practical) for these to be included in the final calculation of the grade. If the final grade is ≥ 5 but any of blocks is failed, the grade on the transcript will be a "4.0 fail". As long as the practical block is passed and the student wishes, the grade corresponding to this block will be saved for the second call the same academic year.

In relation to the SDGs, their evaluation is carried out in all the activities of the subject.

The success rate in the subject for the last three years is 100% (2019-20 academic year), 100% (2020-21 academic year) and 84.62% (2021-22 academic year)