VNIVERSITAT DE VALÈNCIA

Course Guide
43273 Impacts on the aquatic environment

COURSE DATA

Data Subject	
Code	43273
Name	Impacts on the aquatic environment
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2148 - Master's degree in Biodiversity: Conservation and Evolution	Faculty of Biological Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
2148 - Master's degree in Biodiversity: Conservation and Evolution	11 - Protection of the diversity of ecosystems	Optional

Coordination

Name	Department
GARCIA ROGER, EDUARDO MOISES	275 - Microbiology and Ecology

SUMMARY

"Impacts on the Aquatic Environment" aims to provide students with knowledge to assess the problems, especially in terms of the alteration of the aquatic environment, pollution and water scarcity, which can affect aquatic continental (rivers, lakes, reservoirs, tidal flats, reservoirs, marshes) and marine ecosystems, promoting a critical behavior towards the irrational use of water and non respectful activities regarding its quality, that favors a sustainable use of this resource compatible with the conservation of the aquatic ecosystems.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

Previous knowledge on Biology is recommended, including basic Ecology (from the grade in Biology, Environmental Sciences or equivalent). Theoretical and applied knowledge of other disciplines is also required, especially Water Chemistry, and to a lesser extent Physics.

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

2148 - Master's degree in Biodiversity: Conservation and Evolution

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- To acquire basic skills to develop laboratory work in biomedical research.
- Be able to access the information required (databases, scientific articles, etc.) and to interpret and use it sensibly.
- Stimulate the capacity for critical reasoning and for argumentation based on rational criteria.
- Favour intellectual curiosity and encourage responsibility for one's own learning.

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

- To know the aquatic areas likely to be protected.

- To identify the key quality indicator organisms.

- To know the physicochemical that affect the aquatic environment.

- To manage disturbances and seek solutions to reduce and, if necessary, eliminate their harmful effects.

Objectives:

1. Training for the knowledge of natural aquatic areas.

2. Training to recognize human alterations to the environment.

3. Training for the contribution of solutions for environmental recovery.

DESCRIPTION OF CONTENTS

1. Water as a resource

Physical properties and the cycle of water. Water as a resource, sustainable planning of water use. Control of demand in the face of increasing supply. Provision, renewal and regulation of surface water use. Exploitation of aquifers. Autonomy in water use (desalination, water reuse). Water saving solutions in agriculture, industry and cities.

2. Water pollution

Water pollution. Pollutants. Pollution sources.

3. Effects of water pollution

Effects on individual organisms: toxicity assays, effects on metabolism, effects on physiology and interactive effects of pollutants. Effects on populations: effects on population dynamics and evolution of resistance to contamination. Effects on communities and ecosystems.

4. Use of ecological status indices in rivers in the context of the Water Framework Directive

The Water Framework Directive. Typological classification of rivers. Criteria for the selection of reference sites and definition of reference conditions. Indexes for the study of the ecological status of rivers: organisms used, unimetric indexes, multimetric indexes. EQR values and intercalibration exercises. Establishment of quality classes.

5. Ecological status indicators in ponds, lakes and reservoirs

Ponds and lakes in the context of the Water Framework Directive. Typological classification of ponds and lakes. Criteria for the selection of reference sites and definition of reference conditions. Indexes for the study of the ecological status in ponds and lakes.

6. Ecological status indicators in marine environments

The marine environment. Types of indicators: environmental and habitat indicators, indicators based on ecological strategies, indicators based on key species, indicators based on size, trophodynamic indicators. Network analysis. Examples.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	20,00	100
Laboratory practices	10,00	100
Attendance at events and external activities	5,00	0
Development of group work	5,00	0
Study and independent work	10,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	5,00	0
Preparation of practical classes and problem	5,00	0
Resolution of case studies	5,00	0
Resolution of online questionnaires	5,00	0
TOTAL	**75,00**	

TEACHING METHODOLOGY

- Lectures on theoretical aspects. They will be complemented with practical exercises of manual calculation and use of software for the management of taxonomic information and biological traits in the determination of indices and monitoring metrics for the evaluation of the ecological status of different types of aquatic ecosystems.

- Oral expositions on specific topics and their participative discussion by the whole group.

- Laboratory classes, with emphasis on the most common methods and techniques.

EVALUATION

- Continuous assessment of the activity carried out by the student (participative attendance, presentation of work, handling of material, equipment, organisation of work). This will represent 20% of the final grade.

- Presentation of seminars. This will represent 30% of the final grade.

- Written exams based on the learning outcomes and the specific objectives of each subject in its theoretical part. It will represent the remaining 50% of the final grade.

REFERENCES

Basic

- Andreu, E. & A. Camacho. 2002. Recomendaciones para la toma de muestras de agua, sedimentos y biota en humedales Ramsar. Dirección General de Conservación de la Naturaleza, Ministerio de Medio Ambiente. Madrid.
- APHA - AWWA WEF. 1992. Standard methods for the examination of water and wastewater. 18th edition. American Public Health Association. Washington D.C., 1100 pp.
- Dodds W. K. 2003. Freshwater Ecology. Academic Press.
- Kalff, J. 2002. Limnology. Prentice Hall. 592 pp.
- Maitland P.S. & N.C. Morgan 1997. Conservation and management of freshwater habitats: lakes, rivers and wetlands. Chapman & Hall-Kluwer. New York.
- Mason , C. 2001. Biology of Freshwater Pollution. Prentice Hall.
- Wetzel, C. 2001. Limnology. Elsevier.
- Wetzel R.G. & Likens G.E. 2000. Limnological analyses. Springer-Verlag, New York.

Additional

- Directiva 2000/60/CE del Parlamento Europeo y del Consejo, de 23 de octubre de 2000, por la que se establece un marco comunitario de actuación en el ámbito de la política de aguas (Directiva Marco del Agua)
- REAL DECRETO LEGISLATIVO 1/2001, de 20 de julio, por el que se aprueba el Texto Refundido de la Ley de Aguas
- Legislación Europea (Directivas), Española y Autonómica sobre el Medio Ambiente, vertidos, residuos y calidad de las aguas y del medio acuático.