Asignatura: BIOLOGICAL MONITORING
Código: 32764
Centro: Facultad de Ciencias - UAM
Titulación: Master in Inland Water Quality Assessment
Nivel: Máster
Tipo: Obligatoria-Mandatory
Nº de créditos: 4

ASIGNATURA / COURSE TITLE

MONITORIZACIÓN BIOLÓGICA / BIOLOGICAL MONITORING

1.1. Código / Course number

32764

1.2. Materia / Content area

This course is mandatory and is not included in any higher rank area within the master

1.3. Tipo / Course type

Compulsory subject

1.4. Nivel / Course level

Master

1.5. Curso / Year

1st

1.6. Semestre / Semester

1st semester

1.7. Número de créditos / Credit allotment

4 ECTS

1.8. Requisitos previos / Prerequisites

None.

1.9. Requisitos mínimos de asistencia a las sesiones presenciales / Minimum attendance requirement

Attendance is mandatory.

Any student that has missed at least the 10% of the classess will be qualified as “unevaluated”.

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1.10. Datos del equipo docente / Faculty data

Docente(s) / Lecturer(s): Dr. Paloma Alcorlo and Dr. Eugenio Rico
Departamento de Ecología/ Department of: Ecology
Facultad Ciencias / Faculty: Sciences
Despacho – Módulo: C-118 (Alcorlo) and C-106 (Rico) Edificio de Biología
Office – Module: C-118 (Alcorlo) and C-106 (Rico) Biology building
Teléfono / Phone: +34 914972808 (Alcorlo), +34 914978278 (Rico)
Correo electrónico/Email: paloma.alcorlo@uam.es, eugenio.rico@uam.es
Página web/Website:
Horario de atención al alumnado/Office hours: previous appointment.

1.11. Objetivos del curso / Course objectives

Two main objectives can be outlined:

1. Students will learn sampling strategies, sampling techniques and sample treatment concerning biological material from lakes and streams.
2. Students will learn how to assess environmental status in lakes and streams based on results from sampling exercises.

After finished studies, students shall be prepared for water management tasks in governmental, regional and/or community administrations *(think of the EU Water Framework Directive and all steps included here)*.

1.12. Contenidos del programa / Course contents

Module 1. Definitions and principles of biological monitoring. Evolution of the concept of quality in aquatic ecosystems. Water Framework Directive in relation to biomonitoring. Organisms used as elements of quality in aquatic ecosystems. Eco-regionalization and reference conditions.

Module 2. Sampling strategies in and lentic aquatic ecosystems. Sampling methodologies for different biological quality elements. Instrumentation and analytical methods for samples in laboratory.

Module 3. Biological Indices. Genesis, typology and evolution. Assessment of the ecological status of aquatic ecosystems through biological monitoring. Implementation of biomonitoring programs in developed countries. Comparison of biological indices.

Module 4. Emerging trends in integrated programs of biomonitoring and management.

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1.13. Referencias de consulta / Course bibliography

Chapman, D. (ed.) 1992. Water quality assessments. A guide to the use of biota, sediments and water in environmental monitoring. Chapman & Hall, London.

Heinonen, P.; Ziglio, G & A. Van der Beken. 2000. Hydrological and limnological aspects of lake monitoring. John Wiley & sons ltd. England.

Loeb, S.L. & A. Spacie (eds.), 1994. Biological monitoring of aquatic systems. Lewis Publishers, Boca Raton (Florida).

Rosenberg, D.M. & V.H. Resh, (eds), 1993. Freshwater biomonitoring and benthic macroinvertebrates. Chapman & Hall, London

Salanki, J., Jeffrey, D., Hughes, G. M. (Eds.). 1994. Biological Monitoring of the environment. A Manual of Methods. CAB International, IUBS.
Water Framework Directive 2000. Directive of the European Parliament and of the Council 2000/60/EC Establishing a Framework of Community Action in the Field of Water Policy.

Wright, J.F.; Sutcliffe, D.W.; & M.T. Furse (eds.) 2000. Assesing the biological quality of fresh waters: RIVPACS and other techniques. Freshwater Biological Association, UK

Ziglio, G., Siligardi, M. & G. Flaim. 2006. Biological monitoring of rivers. Aplications and perspectives. John Wiley & sons ltd. England.

2. Métodos docentes / Teaching methodology

1. Lectures
2. Seminars and practical classes
3. Problem solving *prepared individually, by pairs and in groups*:
4. Online teaching
5. Office hours, including online

3. Tiempo de trabajo del estudiante / Student workload

Lectures:	25
Individual assignments:	15
Critical reading:	15
Exercices	15
Student seminars:	10
Personal student work:	20

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Total amount of work measured in hours	100

4. Métodos de evaluación y porcentaje en la calificación final / **Evaluation procedures and weight of components in the final grade**

Written exam and/or Final Seminar	70%
Task and Assignments	20%
Class participation and Punctuality	10%

Any student that participated less than 10% of evaluable activities will be qualified as "unevaluated".

In the case that the student does not obtain the minimum requirements for passing the course (see evaluation section) will have another opportunity "convocatoria extraordinaria" at the end of the academic year.

5. Cronograma* / **Course calendar**

To be defined, it depends on th rythm of the classes, most probably will be like this:

Date	Hours	Topic	Teacher
2 October	12.00-14.00h	Introduction	Paloma
9 October	12.00-14.00h		
10 October	9.30-11.30h		
16 October	12.00-14.00h	Biological monitoring concept and Water Framework Directive	Paloma
17 October	9.30-11.30h	Sampling Macroinvertebrates, Fish, Phytobenthos, Macrophytes and Phytoplankton. Biological Indices	Paloma
18 October	12.00-14.00 h		
23-27 October		*IMON Integrated Monitoring Laboratory (Lab and Fieldwork)*	
13 November	12.00-	Biological monitoring concept and Water	Paloma

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	14.00h	Framework Directive	
15 November	12.00-14.00h	Biological Indices	Paloma
20 November	12.00-14.00h	Biological Indices	Paloma
22 November	12.00-14.00h	Biological Indices	Paloma
27 November	12.00-14.00h	Biological Indices	Paloma
28 November	9.30-12.00h	Biological Indices	Eugenio
30 November	12.00-14.00h	Biological Indices	Eugenio
3 December	**9.30-14.00h**	**Biological Indices**	**Eugenio**

4 December	**9.30-14.00h**	**Evaluation.** **Student Final Presentations: Seminars.**	Paloma