Asignatura: Integrated Monitoring and Field Studies
Código: 72767
Centro: Facultad de Ciencias
Titulación: Master of Inland Water Quality Assessment
Nivel: Master
Tipo: Obligatoria- Mandatory
Nº de créditos: 6 ECTS

ASIGNATURA / COURSE TITLE

MONITORIZACIÓN INTEGRADA Y ESTUDIOS DE CAMPO /INTEGRATED MONITORING AND FIELD STUDIES

1.1. Código / Course number

72767

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

FIRST SEMESTER

1.7. Número de créditos / Credit allotment

6 ECTS

1.8. Requisitos previos / Prerequisites

A Bachelor degree with a major in Biology, Environmental sciences or Environmental Engineering for doing the master. In this course, it is extremely important to have an updated expertise in laboratory disciplines.

Within this course the knowledge about European Aquatic Ecology, Biological and Chemical Monitoring and Aquatic Bioindicators are highly recommended.

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

A minimum of 80 % of in-class sessions is mandatory. Attendance to field work and laboratory sessions is mandatory.

1.10. Datos del equipo docente / **Faculty data**

COORDINADOR/COORDINATOR: Dr. Elvira Perona (Dpt. Biology)

Facultad / Faculty of Sciences (UAM)
Despacho - Módulo / Office – Module Coordinator of the course Elvira Perona B-002
Teléfono / Phone: +34 91 4978175
Correo electrónico/Email: elvira.perona@uam.es
Página web/Website: www.uam.es/iwqa
Horario de atención al alumnado/Office hours: L-V 9-17

1.11. Objetivos del curso / **Course objectives**

At the end of the course the students will have acquired the knowledge and skills to apply the Water Framework Directive (WFD, 2000) into the water monitoring studies. This course provides the students an integrated approach of concepts, methods and techniques in water quality studies. This involves:

1. *Content knowledge*:

The students will recognize the properties and functioning of different aquatic systems and will learn how to develop chemical, biological and ecosystem analyses using different monitoring strategies. Students will learn how the water authorities are organized in Spain.

2. *Skills and abilities*:

The students will manage to work in different aquatic systems (rivers, reservoirs and aquifers), will learn to prepare and design a monitoring study, including: the definition of the aims, the sampling procedures, to collect chemical and biological samples and to use specific devices and technics regarding aquatic ecosystems, to perform chemical and biological laboratory analyses, and to critically interpret and discuss the results obtained and to write a report, including management implications..

1.12. Contenidos del programa / **Course contents**

- Module 1: Theoretical concepts on inland water management

Administrative structure on Hydraulic Public domain, discharge permits, and organizing a monitoring program.

- Module 2: Monitoring studies

To define, organize and develop a monitoring program on different aquatic systems, including
-To recognise different types of inland aquatic ecosystems.
-To learn sampling methods of water and biological systems
- To make measures of physical and chemical variables in situ and in laboratory
-To learn different methods and strategies of chemical and biological sampling and analyses techniques,

Module 3: Analysing and presenting results for monitoring studies:
- To compare results obtained under ecological, chemical and biological point on view
- To write and present an assay/report with the data obtained.

1.13. Referencias de consulta / **Course bibliography**

- Agence de l'Eau Artois-Picardie 1998. Guide Methodolodique pour la mise en oevre de L'indice Biologique Diatomées (english version included).

- American Water Works Association/American Public Works Association/Water Environment Federation (2017). Standard Methods for the Examination of Water and Wastewater, 23rd Edition. 1496 pp.

- Elosegui, A. & Sabater S.(EDS) 2013 Conceptos y Técnicas en Ecología Fluvial, ED. Fundacion BBVA,

- Hellawell J.M. 1989. Biological indicators of freshwater pollution and environmental management. En: Pollution monitoring series. Elsevier Science Pub. Norwich

- John D.M., Whitton B.A. & Brook A.J. (Eds) 2002. The freshwater algal flora of the British Isles. An identification Guide to Freshwater and terrestrial Algae. Cambridge University Press. London.

Munné A., Ginebreda A. & Prat N. (Eds) 2016. Experiences from surfave water quality monitoring. The EU water framework Directive implementation in the Calatan River Basin District. Handbooks of environmental chemistry 42 (Barcelo & Kostianoy Eds) doi.org/10.1007/978-3-319-23895-1

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UNITED STATES GEOLOGICAL SURVEY (2015). National Field Manual for the Collection of Water-Quality Data. Techniques of Water-Resources Investigations Book 9. Handbooks for Water-Resources Investigations. Available on line at https://water.usgs.gov/owq/FieldManual/

2. Métodos docentes / **Teaching methodology**

1. Theoretical lectures in classroom and e-learning.
2. Practical lectures: Intensive field and laboratory work (chemical, biological, ecological issues)
3. Group tasks: Interpretation of results and discussion, including computer sessions to organize, manage and analyse data bases
4. Written and oral presentation of reports
5. Conferences of invited speakers regarding hydraulic public domain, surveillance and consultancy of aquatic ecosystems
6. uthorships

The students will be organized in groups of 3-5 students. Field work will be done by all students within the groups who will develop both the field work as well as the laboratory analyses and writing and presenting the report

3. Tiempo de trabajo del estudiante / **Student workload**

Tasks	**hours**
lecture attendance: (presential)	15
Field tasks (presential)	30
Laboratory tasks (presential)	55
Interpretation of results	50
Total amount of work measured in hours	150

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

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Distribution of the final grade among the different activities and in relation to the amount of work the student has to do for the course, expressed in percentages

Continuous evaluation of tasks developed in field and laboratory:
- 60 % Final report
- 40 % individual field and lab work, exercises, discussions.

Final report: including the main results and discussion on the results obtained in scientific format (no more than 50 pages).
Next sections should be included in the report: Title, Abstract, Abbreviations, Index, Introduction and Main objectives, Description of the study area, Methodology, Results (including tables and graphs), Discussion, References and Annex.

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, correcting final reports and exercises required.

5. Cronograma* / Course calendar at UAM

Week	Contents	Contact hours	Independent study time
1 and 3	Lectures, preparation field work, ,	4 days	10 h
4	Field work	3.5 full days	
4-5	laboratory work	6 full days (12 sessions)	
6	Results and discussion	8 h	20h
7	Report elaboration	-	30h
8	Report presentation	10 h	

The field and lab activities will take place during October and November and the final report will be presented before Christmas time*

*It is a tentative schedule course, for a more detail one, please checks the final calendar.