



Asignatura: Aquatic ecotoxicology  
Código: 32769  
Centro: Fac. Ciencias/ Sciences Faculty  
Titulación: Inland Water Quality Assessment  
Nivel: Master  
Tipo: Optativa /Elective  
Nº de créditos: 4

## ASIGNATURA / COURSE TITLE

Aquatic Ecotoxicology

### 1.1. Código / Course number

32769

### 1.2. Materia / Content area

Aquatic Ecotoxicology

### 1.3. Tipo / Course type

Formación Optativa/Elective subject

### 1.4. Nivel / Course level

Máster/ Master

### 1.5. Curso/ Year

1º/1st

### 1.6. Semestre / Semester

2º/ 2nd

### 1.7. Idioma / Language

English

### 1.8. Requisitos previos / Prerequisites

The students taking this course should have learnt the contents of the mandatory courses: Water Pollution and Aquatic Bioindicators



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

Attendance is mandatory, at a minimum of 80 % of in-class sessions is mandatory

However, attendance to seminars and discussions, chats is also mandatory.  
Practicals will be done in laboratory and thus the attendance is mandatory.

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

Coordinador / **Coordinator**: Keila Martín Betancor  
Departamento de / **Department of Biología**  
Facultad / **Faculty Ciencias**  
Despacho - Módulo / **Office - Module - B-006**  
Teléfono / **Phone**: 34914978183  
Correo electrónico/**Email**: Keila.martin@uam.es  
Página web/**Website**:  
Horario de atención al alumnado/**Office hours**: 9-18

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

The students in this course will understand the relevance of ecotoxicology within the Life Sciences framework. Students also will understand the fate including the biological transformations of pollutants in freshwater ecosystems. The students will understand the molecular and biochemical action mechanisms of toxicants typically found in freshwaters, understanding the lethality and chronicity concepts. At the end of the course students will be able of selecting the optimal ecotoxicological test for each situation, obtaining the EC, LC, LOEL, NOEL values or a polluted system or substance, producing an ecological interpretation of the obtained results.

In particular students will acquire next competences:

- Understand the contents in the course providing an opportunity of being original in the development and/or application of ideas
- Know how to apply the knowledge acquired and the capability of problem resolution in environments not completely known within a wider context but in the study area
- To know how to communicate the conclusions and knowledge and ultimate reasons supporting them to specialized and non-specialized audiences and a clear fashion
- They will acquire the learning skills allowing them to proceed in the learning pathway in an autonomous fashion



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## 1.12. Contenidos del programa / Course contents

1. History and present situation of Aquatic ecotoxicology. REACH Directive
2. Chemical compounds in ecosystems.
3. Ecotoxicological exposure of biological systems
4. Subcellular and cellular effects. Effects on trophic webs. Synergy and antagonisms
5. Community and ecosystem stress.
6. Methods in ecotoxicology: laboratory biotest, *in situ* methods in ecological studies
7. Key pollutants. Predictive ecotoxicology

## 1.13. Referencias de consulta / Course bibliography

Chen G. and White P.A. 2004. The mutagenic hazard of aquatic sediments: a review. *Mutation research* 567:151-225

Crane M., Grosso A., Whitehouse P. & Forrow D. 2004. Risk Characterisation in Direct Toxicity Assessment of The River Esk and The Tees Estuary. *Ecotoxicology* 13:463-474

Dwyer F. J., Hardesty D. K, Henke C. E., Ingersoll C. G., Whites, D. W., Augspurger T., Canfield T. J., Mount D. R. & Mayer F. L. 2005. Assessing Contaminant Sensitivity of Endangered and Threatened Aquatic Species: Part III. Effluent Toxicity Tests. *Archives of Environmental Contamination and Toxicology* 48 (2): 174-183

Emmanuel E., Perrodin Y., Keck G., Blanchard J.-M. & Vermande P. 2005. Ecotoxicological risk assessment of hospital waste water: a proposed framework for raw effluent discharging into urban sewer network. *Journal of Hazardous Material* 117:1-11.

Fent K. 2003. Ecotoxicological problems associated with contaminated sites. *Toxicology Letters* 140-141:353-365

Hernando M.D., Fernandez-Alba A.R., Tauler R. & Barcelo D. 2005. Toxicity assays applied to waste water treatment. *Talanta* 65:358-366

Ohe T., Watanabe T. and Wakabayashi K. 2004. Mutagens in surface waters: a review: *Mutation Research* 567:109-149



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Postma J.F., de Valk S., Dubbeldam M., Maas, J.L., Tonkes, M., Schipper C.A. & Kater B.J. 2002. Confounding Factors in Bioassays with Freshwater and Marine Organisms. *Ecotoxicology and Environmental Safety* 53 (2): 226-237

Power E.A. & Boumphrey R.S. 2004. International trends in bioassay use for effluent management. *Ecotoxicology* 13:377-398

Wadia K., Thompson. 2007. Low cost ecotoxicity testing of environmental samples using microbiotests for potential implementation of the water Framework Directive. *Trends in Env. Chem.* 26:300-307

Whitehouse P., Johnson I., Forrow D.M., Chubb C. 2004. A regulatory framework for controlling effluent discharges using toxicity testing in the UK. *Ecotoxicology* 13: 399-411

Wolska L., Sagajdakow A., Kuczyńska A., Namieśnik. 2007. Application of ecotoxicological studies in environmental monitoring. *Trends Anal. Chem.* 26:332-344

## 2. Métodos docentes / Teaching methodology

This course consist of theoretical lessons where all the subjects detailed in the program are exposed and discussed. There will also be three days of laboratory practices where the students will put into practice the knowledge acquired comparing different standard ecotoxicology bioassays using organisms from different biological complexity: Bacteria (*Vibrio*), algae (*Pseudokirchneriella*) or metazoan (*Daphnia*), with a presumably polluted effluent.

Next teaching methodologies will be used:

Theoretical lessons supported with multimedia materials  
 Seminars and expert talks  
 Laboratory practices  
 Debate of presented materials

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

		No. hours
Presential	Theoretical Lessons	25
	Practical Activities	15
	Work group Seminar	5



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Non presential	Practical written report	10
	Seminar preparation	15
	Exam written report	30
<b>Total Amount</b>		<b>100</b>

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

Final score will be calculated assuming the credit load of each module and students assignments

Exam written report: 60 %

Seminar: 20 %

Practical Activities: 20 %

Every part (EXAM/SEMINAR/OTHER ACTIVITIES) should be passed independently for the final score in Aquatic Ecotoxicology.

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) can repeat the failed part at the end of the academic year (June-July) (“convocatoria extraordinaria”)

#### 5. Cronograma\* / Course calendar

Semana aprox. Week	Contenido Contents	Horas presenciales Contact hours	Horas no presenciales Independent study time
1st	Introductory sessions	4	4
2nd	Concept sessions	8	6
	Practicals	12 (3 sessions)	10
3-4th	Discussion/ seminars	11	15
5th	Exam preparation and tutotials	10	20

\* Tentative chronogram