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

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

A significant part of this course will be taught by e-learning methodologies. However, some practicals will be done in laboratory and thus the attendance to those practicals is mandatory.

1.10. Datos del equipo docente / Faculty data

Coordinador / Coordinator: Antonio Quesada
Departamento de / Department of Biología
Facultad / Faculty Ciencias
Despacho - Módulo / Office – Module – B-010a
Teléfono / Phone: 34914978181
Correo electrónico/Email: Antonio.quesada@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

1.12. Contenidos del programa / Course contents

1. History and present situation of Aquatic ecotoxicology. REACH Directive

2. Chemical compounds in ecosystems.

3. Ecotoxiological exposure of biological systems

4. Subcelular y celular effects. Effects on trophic webs. Sinergy 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

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., Kuczy´nska A., Namie´snik. 2007. Application of ecotoxicological studies in environmental monitoring. Trends Anal. Chem. 26:332-344

2. Métodos docentes / **Teaching methodology**

This course will be taught mainly using e-learning methodologies. However, there will be contact teaching for one week in February. In that week , there will be practicals comparing different standard ecotoxicology bioassays using organisms from different biological complexity: Bacteria (Vibrio), algae (Pseudokirchneriella), metazoan (Daphnia), with a presumably polluted effluent.

Next teaching methodologies will be used:

Theoretical lessons supported with multimedia materials
Seminars and expert talks
Visits to scientific instalations
Laboratory practicals
Debate of presented materials

Teaching dynamics: the course will start with a formal presentation of the course and some basic introductory sessions, that will take place at the classroom. Then, a number of e-learning sessions will be available for the students, with continuous virtual contact with the professor, with frequent exercises and discussion forums. Then in February the students will have laboratory practicals, and then the students will have more e-learning sessions.

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

		No. hours	Percentage
Presential	Theoretical and practical lectures	45	60%
	Seminars	5	
	Final Exam	5	
	Visits	5	
Non presential	Week study	20	40%
	Seminar preparation	20	
Total Amount		**100**	

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

Written tests represent between 50 and 70% of the total evaluation

The written reports delivered and presented to the course represent between 20 and 40% of the total evaluation. Written Exercises will represent between 10 and 30% of the total evaluation.

In any case both parts of the course need to be passed to pass the course, no average will be made with marks below 50% in each part.

The student not passing the exam in the first call will need to repeat the failed (below 50%) parts in the second call

5. Cronograma* / **Course calendar**

Semana aprox. **Week**	**Contenido** **Contents**	**Horas presenciales** **Contact hours**	**Horas no presenciales** **Independent study time**
19-24 Jan	Introductory sessions	4	4
26-30 Jan	Concept sessions	8	6
2-6 Feb	Practicals	12	5
16 Feb-2 March	Discussion/ seminars	11	15

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Semana aprox. Week	Contenido Contents	Horas presenciales Contact hours	Horas no presenciales Independent study time
23-27 Feb	Exam preparation and tutotials	10	20
9 March	exam	5	

*Este cronograma tiene carácter orientativo. Tentative chronogram