

**COURSE DATA****Data Subject**

<b>Code</b>	43061
<b>Name</b>	Bioassays of ecotoxicity
<b>Cycle</b>	Master's degree
<b>ECTS Credits</b>	3.0
<b>Academic year</b>	2023 - 2024

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
2139 - Master's Degree in Environmental Pollution, Toxicology and Health	Faculty of Biological Sciences	1	Second term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
2139 - Master's Degree in Environmental Pollution, Toxicology and Health	3 - Environmental toxicology	Optional

**Coordination**

<b>Name</b>	<b>Department</b>
ANDREU SANCHEZ, OSCAR ENRIQUE	25 - Plant Biology
SANCHO AGUILAR, ENCARNACION	357 - Cellular Biology, Functional Biology and Physical Anthropol.

**SUMMARY**

The topics that make up the programme provide students with a brief overview of aquatic and terrestrial ecotoxicology.

The programme is oriented towards the presentation of fundamental concepts and their direct application to cases in which the evaluation of the effects produced by xenobiotics on living beings can alter the functioning of part or all of an ecosystem.

Special attention is given to aquatic and terrestrial toxicology as well as to the physiological alterations that occur in living beings when they are subjected to the action of different toxicants, especially biocides, pesticides and heavy metals.



The standards and technical guides included in the current regulations will be reviewed, both at the European level that includes the use of (eco)toxicity bioassays for the authorisation of different families of chemical substances (BPR, REACH, CLP and PPP Directives) as well as at the national level where different regulations described in the Waste Act, Contaminated Soil Act, Landfill Ordinances, etc. are cited.

They also regulate the development of (eco-) toxicological tests, with emphasis on the international bodies and agencies that regulate and draw up these standards (OECD, ISO, UNE, ASTM, etc.).

## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

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

### Other requirements

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

### 2139 - Master's Degree in Environmental Pollution, Toxicology and Health

- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Capacidad de utilizar las nuevas tecnologías de la información y la comunicación.
- Capacidad de análisis, síntesis y razonamiento crítico en la aplicación del método científico.
- Capacidad para el aprendizaje autónomo y organizado y para la adaptación a nuevas situaciones.
- Comprensión del mundo natural como producto de la evolución y de su vulnerabilidad frente a la influencia humana.
- Comprender los mecanismos de toxicidad de contaminantes.
- Diseñar bioensayos de ecotoxicidad en suelos y aguas.
- Diseñar y ejecutar programas para la prevenir la contaminación del medio acuático continental y del litoral.
- Realizar diagnóstico de problemas ambientales.



- Evaluar la calidad de aguas.
- Comprender e interpretar los procesos de contaminación de las aguas y sus efectos.

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

### **SKILLS TO ACQUIRE.**

- To handle scientific terminology properly and become familiar with their sources.
- To get an integrated view of the defense mechanisms of adaptation to the environment of animals. Make sense of foreground, interrelate and apply.
- Ability to analyze data, choosing the right method, critical evaluation and interpretation of experimental results in various forms of expression (tables, graphs ...).
- Acquire synthesis capacity to collect, coherently and in an organized way, information or data of different origins.
- Meet the management of basic scientific instrumentation typical of Applied Physiology.

### **SOCIAL SKILLS**

- Develop capacity for critical thinking, fostering communication and discussion with a view to stimulating individual creative ability.
- Ability to work in groups when dealing with problematic situations collectively.
- Ability to build a comprehensive text written and organized.
- Ability to speaking to a public audience, such as the class itself, by exposure or intervention in a debate on a topic or controversial issue.
- Ability to interact with both the teacher and with peers.
- Interest in social and economic application of science and in particular the Environmental Toxicology.
- Interest in popular science and the impact of science on culture and consciousness of society.
- Professional training. Acquisition of scientific and technical knowledge related to resistance to xenobiotics that will facilitate the work in Environmental Toxicology in a society in continuous technological progress.

## **DESCRIPTION OF CONTENTS**

### **1. TEORY**

Topic 1: Ecotoxicological tests in the European regulatory framework (REACH, BPR, CLP)

Topic 2: Toxicological tests in the European regulatory framework (REACH, BPR, CLP)

Topic 3: Bioassays in environmental legislation. Damage to the environment

Topic 4: Regulatory bodies, evaluation committees (OECD, ANOR, ISO)



## 2. PRACTICE

Different ecotoxicological tests of aquatic environment will be carried out with different reference organisms that encompass different trophic chain levels (zooplankton and/or phytoplankton).

The tests will be carried out following standardized norms and reference toxic substances will be used for the evaluation of different end points habitually used in ecotoxicology.

The sessions will be held in the morning during four consecutive practical sessions

## 3. SEMINAR

The course work will consist of the study of a technical guide or reference standard (\*OECD, ISO, etc.) and a scientific article in which the reference standard is undertaken. All of them must be summarized and analyzed orally by means of a PowerPoint presentation to the rest of the classroom. The presentation of the work will be done in pairs and will last 40 minutes.

## WORKLOAD

ACTIVITY	Hours	% To be attended
Laboratory practices	19,00	100
Theory classes	11,00	100
Development of group work	5,00	0
Development of individual work	10,00	0
Study and independent work	12,00	0
Preparation of evaluation activities	6,00	0
Preparation of practical classes and problem	12,00	0
<b>TOTAL</b>	<b>75,00</b>	

## TEACHING METHODOLOGY

- Master class for acquiring the fundamental knowledge, including methodological aspects.
- Practice class on the evaluation of pollution effects.
- All activities and master classes are reinforced with documentation and information exchanges between lecturers and students using the “Aula Virtual” tool of the Universitat de València webpage.

## EVALUATION



There will be a written exam in which questions related to what has been seen in the seminars and practicals will be asked. The value of this test is 60% of the final evaluation

The seminar papers will be assessed on the basis of the written report of the paper and the classroom presentations. The value of this part is 20% of the final evaluation. The assistance to seminars is mandatory. Any absence will be justified

The evaluation of the laboratory sessions will be carried out continuously throughout the 4 sessions, assessing attendance, participation, execution of the practicals (handling of material and equipment, organisation of the work, understanding and use of the practical guide), performance of calculations, discussion of results, teamwork, etc. The value of this part is 20% of the final evaluation.

It is mandatory to obtain a 4/10 to compensate between different subject parts

## REFERENCES

### Basic

- David Hoffman, Barnett Tattner, Allen Burton and John Cairns. HandBook of Ecotoxicology. CRC Press 1995. ISBN 0-87371-585-3
- RAND, G. M. (1995). Fundamentals of aquatic toxicology.
- SNELL, K.; B. MULLOCK (1987). Biochemical toxicology.
- BRAUNBECK, T.; W. HANKE, H. SEGNER (1993). Fish. Ecotoxicology and Ecophysiology.
- BACCI, E (1994). Ecotoxicology of organic contaminants.
- REPETTO, M. (1981). Toxicología fundamental.
- DUFFUS, J.H. (1983). Toxicología ambiental.
- HOERSCH, H.M.; J.R. SCHROEDER, K.A.; GREENE, B. (1986). Aquatic Toxicology and Environmental Fate.
- Repositorio de Guías Técnicas de la OECD: [https://www.oecd-ilibrary.org/environment/oecd-guidelines-for-the-testing-of-chemicals\\_72d77764-en](https://www.oecd-ilibrary.org/environment/oecd-guidelines-for-the-testing-of-chemicals_72d77764-en)