

**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>	2020 - 2021

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
2139 - M.U. en Contaminación, Toxicología y Sanidad Ambient. 12-V.2	Faculty of Biological Sciences	1	Second term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
2139 - M.U. en Contaminación, Toxicología y Sanidad Ambient. 12-V.2	3 - Environmental toxicology	Optional

**Coordination**

<b>Name</b>	<b>Department</b>
ANDREU SANCHEZ, OSCAR ENRIQUE	23 - Functional Biology and Physical Anthropology
FERRANDO RODRIGO, DOLORES	357 - Cellular Biology, Functional Biology and Physical Anthropol.
SANCHO AGUILAR, ENCARNACION	357 - Cellular Biology, Functional Biology and Physical Anthropol.

**SUMMARY**

The topics that make up the program allow the student to present a succinct vision of Ecotoxicology and some aquatic bioindicators.

The program is oriented towards the exposition of fundamental concepts and their direct application to cases in which the evaluation of the effects produced by xenobiotics in living beings can alter the functioning of a part or the whole of an ecosystem.



Due to its importance, special attention is paid to aquatic toxicology as well as to the physiological alterations that occur in living beings when they are subjected to the action of different toxins, especially pesticides and metals.

## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

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

### Other requirements

## OUTCOMES

### 2139 - M.U. en Contaminación, Toxicología y Sanidad Ambient. 12-V.2

- 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.
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- 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

### 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: Basic concepts in (eco)toxicology

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

Topic 3: Toxicological tests in the European regulatory framework (REACH, BPR, CLP)

Topic 4: Bioassays in environmental legislation. Damage to the environment

Topic 5: Regulatory bodies, evaluation committees (OECD, ANOR, ISO)

Topic 6: The 3R's in research with animals. Animal welfare



## 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.

## WORKLOAD

ACTIVITY	Hours	% To be attended
Laboratory practices	19,00	100
Theory classes	11,00	100
Development of individual work	7,00	0
Study and independent work	12,00	0
Preparation of evaluation activities	6,00	0
Preparation of practical classes and problem	20,00	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

The final grade of the subject is calculated from the mark obtained in each of the three parts in which the subject is divided: theory, work-seminars and practical sessions. Each of them will have a weight of 20%, 40% and 40% respectively.



To compensate between the different parts it will be necessary to have a 4/10.

- The theory part is evaluated through examination with development questions and / or test type and resolution of practical cases (20%)
- The seminars were evaluated based on the written report of the work and the presentation in the class (40%)
- Practical sessions in the laboratory: the evaluation is carried out continuously throughout the practice sessions, evaluating attendance, participation, execution of the practices of manipulation of material and equipment, work organization, understanding and use of the practice guide, calculations, team work, etc. (40%)

## 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.

## ADDENDUM COVID-19

**This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council**

The teaching of the Master in Pollution, Toxicology and Environmental Health, as indicated in the VERIFICA, is ALWAYS PRESENCIAL. However, if the health situation so requires, a massive and immediate change will be made to a system of semi-presence or online.