COURSE DATA

DATA SUBJECT

Code: 47091
Name: Ecotoxicology and Bioassays
Cycle: Master's Degree
ECTS Credits: 3.5
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2285 - Máster Universitario en Contaminación Ambiental y Ecotoxicología	Facultat de Ciències Biològiques	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2285 - Máster Universitario en Contaminación Ambiental y Ecotoxicología	Ecotoxicología	COMPULSORY

COORDINATION

ANDREU SANCHEZ OSCAR ENRIQUE

SANCHO AGUILAR ENCARNACION

SUMMARY

The topics covered in this course provide students with a concise overview of the basic concepts of ecotoxicology and the most commonly used bioassays in aquatic and terrestrial ecotoxicology from the perspective of regulatory compliance in all areas of government (European, national, regional, and local).

The program is geared toward presenting 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.

Due to its importance, special attention is paid 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 toxins, especially biocides, pesticides, and heavy metals.

The standards and technical guidelines included in current regulations will be reviewed, both at the European level, which covers the use of (eco)toxicity bioassays for the authorization of different families of chemicals (BPR, REACH, CLP, and PPP Directives), and at the national level, where different standards are

cited in the Waste Law, Contaminated Soil Law, Discharge Ordinances, etc.

Likewise, those that regulate the development of (eco)toxicological tests will be reviewed, with emphasis on those international bodies and agencies that regulate and draft these standards (ISO, UNE, ASTM, etc.) and technical guidelines (OECD).

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

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

COMPETENCES / LEARNING OUTCOMES

2285 - Máster Universitario en Contaminación Ambiental y Ecotoxicología

Acquire the capacity for autonomous and organised learning and for adapting to new situations.

Act autonomously in learning, make informed decisions in different contexts, issue judgements based on experimentation and analysis and transfer knowledge to new situations.

Assess the risks of pollutants in ecosystems and their biodiversity.

Collaborate effectively in work teams, taking on responsibilities and leadership roles and contributing to collective improvement and development.

Demonstrate critical and self-critical reasoning in the field of the degree, considering aspects such as professional ethics, moral value and the social implications of the different activities carried out.

Design ecotoxicity bioassays in various environmental matrices.

Design specific indicators for a particular environmental risk.

Develop the ability to work in multidisciplinary teams and to cooperate effectively.

Develop the capacity for analysis, synthesis and critical thinking in applying the scientific method.

Diagnose environmental problems.

Evaluate the quality of water and soil.

Know the animal models used for studying human diseases in relation to environmental pollution.

Know the standards and legislation relating to environmental pollution.

Learn how to write scientific articles in the fields of environmental pollution and ecotoxicology.

Understand the effects of pollutants on animal and plant physiology.

Understand the natural world as a product of evolution and its vulnerability to human influence.

Use computer tools, statistical methods and data simulation appropriately, applying software and statistics in ecotoxicology and in issues arising from environmental pollution.

Use different bibliographic sources and biological databases.

DESCRIPTION OF CONTENTS

TEORY

Topic 1: Basic concepts in ecotoxicological test design, types and characteristics of indicator organisms. Species selection.

Topic 2: Types of bioassays: Acute, subchronic, chronic, definition of endpoints, multitrophic vs. multispecies tests. Micro-Meso-Macrocosms.

Topic 3: Regulatory bodies, evaluation committees (OECD, ANOR, ISO)

Topic 4: Interlaboratory tests, organisms, and technical committees (ISO, UNE, OECD). Tests accredited under GLP/BPL and ISO17025. Scope and range

Topic 5: (Eco)toxicological tests within the European regulatory framework (REACH, BPR, CLP, Waste Directive (HP codes).

Topic 6: Bioassays in European and Spanish (national and regional) environmental legislation. Bioassays in laws on waste, contaminated soil, discharges, and port dredging. Assessment of damage to DPH.

Topic 7: Alternative metodologies in ecotoxicology evaluation: *In silico* computation, QSAR and QSTR modelling, Neuronal nets, IA.

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

SEMINAR

Students will conduct a seminar as part of their coursework, consisting of the study of a technical guide or reference standard (OECD, ISO, etc.) assigned by the teaching staff and a scientific article related to the assigned standard, which must be selected by the students themselves through a search in an academic repository (Scopus, ScienceDirect, WoS, etc.). The guide and paper must be summarized and analyzed appropriately and presented orally to the rest of the class using a PowerPoint presentation. The work will be done in pairs and will last approximately 30 minutes.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	21,00
Laboratory	14,00
Total hours	**35,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	2,50
Individual or group project	22,00
Independent study and work	12,00
Preparation of lessons	6,00
Preparation for assessment activities	10,00
Resolution of case studies	0,00
Total hours	**52,50**

TEACHING METHODOLOGY

- Master class for acquiring the fundamental knowledge, including methodological aspects.
- Practice class on the evaluation of pollution effects.
- Exhibition of work/seminars prepared by students
- 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 test covering questions related to the theory classes, seminar assignments, and practical sessions. This test accounts for 70% of the final grade.

The seminar assignments will be assessed based on: the written report, the oral presentation in class, and the questions asked by the teacher and the other students. Attendance at the seminars is compulsory and cannot be made up, except in cases of duly justified absence. This part accounts for 10% of the final grade.

Laboratory practical work will be assessed continuously throughout the four practical sessions, evaluating attendance, participation, performance of practical tasks (handling of materials and equipment, organization of work, understanding and use of the practical work script), calculation, discussion of results, teamwork, etc. This part accounts for 20% of the final grade.

In order to compensate for the grade between each of the parts (coursework, exam, practical work), it will be necessary to obtain at least a 5/10 in the part to be compensated.

To pass the course, it is necessary to obtain a 5/10.

REFERENCES

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.

CAPÓ, M (2019). Principios de ecotoxicología: Diagnóstico, tratamiento y gestión del medio ambiente- Ed. Tébar-Flores-. ISBN 978-8473607049

Repositorio de Guías Técnicas de la OECD: https://www.oecd-ilibrary.org/environment/oecdguidelines-for-the-testing-of-chemicals_72d77764-en