

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

<b>Code</b>	43059
<b>Name</b>	Histology and histopathology of bioindicator animals
<b>Cycle</b>	Master's degree
<b>ECTS Credits</b>	3.0
<b>Academic year</b>	2021 - 2022

**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 MOLINER, ENRIQUE	357 - Cellular Biology, Functional Biology and Physical Anthropol.
ANDREU SANCHEZ, OSCAR ENRIQUE	23 - Functional Biology and Physical Anthropology

**SUMMARY**

The subject "Histology and Histopathology of Bioindicator Organisms" is responsible for transmitting basic knowledge about the principles of cell injury and pathogenesis related to toxins and contaminants in vertebrates and invertebrates. The course will study the basic procedures and techniques for the preparation of samples and tissues as well as the techniques of inclusion, staining and cutting of them, emphasizing the systems of capture, treatment and analysis of images available (microscopic techniques).



## 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 demonstrate self-directed learning skills for continued academic growth.
- 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.
- Desarrollo de un compromiso ético y capacidad de participación en el debate social.
- Comprender los mecanismos de toxicidad de contaminantes.
- Diseñar bioensayos de ecotoxicidad en suelos y aguas.
- Realizar ensayos del ciclo de vida.
- Diseñar planes de biorremediación.
- Valorar los efectos del cambio climático.
- Planificar la explotación racional de los recursos naturales renovables terrestres y acuáticos.
- Conocer los modelos animales para el estudio de enfermedades humanas.
- Diseñar los indicadores específicos para un riesgo ambiental concreto.

## 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. Theory

- Lesson 1: Introduction and basic principles of Histology and Histopathology of bioindicator animals
- Lesson 2: The methodology applied to Histopathology
- Lesson 3: Diagram of normal histology of bioindicator vertebrates and invertebrates.
- Lesson 4: Basic techniques and procedures in histopathological analysis
- Lesson 5: Analysis of case studies and discussion of scientific studies

### 2. PRACTICAL SESSIONS

- 1.- Visit to the microscopy section of the SCSIE-UV
- 2.- Visit to the SCSIE-UV cell culture section
- 3.- citotox assay by means of MTT procedure
- 4.- Practical session in computer classroom.



## WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	21,00	100
Development of group work	7,00	0
Study and independent work	12,00	0
Preparation of evaluation activities	16,00	0
Preparing lectures	10,00	0
<b>TOTAL</b>	<b>66,00</b>	

## TEACHING METHODOLOGY

The subject is structured in:

- Master classes of theory to develop the fundamental knowledge and the methodology to use.
- Practical and demonstrative classes in which practical aspects of pollutant assessment will be dealt with, including instrumental measures and experimental data handling.
- Seminars, which are carried out by groups of a few students. The teacher will propose a topic among which the students will be able to choose. The students will look for the bibliography and will develop a work that they will present orally to the rest of the students and to the teacher. The lectures will last until the end of the course.
- A collective tutorial will be held to follow up on the work. It will answer the questions posed by the students. The other side includes a one-hour distance tutorial to exchange information with the students and answer their questions.
- In all activities, the University of Valencia's virtual classroom will be used for exchanging documents and communication.

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## EVALUATION

- Written exam on the theoretical and/or practical classes: based on the learning results and the specific objectives of each subject. The theory exam represents (20%)
- Preparation of a paper and defence of the subject on a topic related to the subject taken from a published scientific paper, the quality of the oral presentation, the powerpoint and the knowledge about the subject will be evaluated (50%)
- Continuous evaluation of students in theory classes, laboratories and seminars: participative assistance, handling of material and equipment, work organisation, understanding and use of practice guides, calculation, teamwork, etc. (30%)



## REFERENCES

### Basic

- Wheater, Burkitt and Daniels. 2002. Histología Funcional. Ed Jims
- Técnicas de Histología Animal. R. Martoja and M. Martoja. Ed. Toray-Masson
- Stevens, Lowe and Young. 2002. Histopatología Básica. Ed Elsevier

### Additional

- <http://histology-world.com/>
- <http://www.udel.edu/biology/Wags/histopage/histopage.htm>
- <http://www.deltagen.com/target/histologyatlas/HistologyAtlas.html>

## 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.