

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

Code	43046
Name	Polluting processes
Cycle	Master's degree
ECTS Credits	9.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2139 - M.U. en Contaminación, Toxicología y Sanidad Ambient. 12-V.2	Faculty of Biological Sciences	1	First term
3108 - Environmental Health, Pollution and Toxicology	Doctoral School	0	First term

Subject-matter

Degree	Subject-matter	Character
2139 - M.U. en Contaminación, Toxicología y Sanidad Ambient. 12-V.2	1 - Core training	Obligatory
3108 - Environmental Health, Pollution and Toxicology	1 - Complementos Formación	Optional

Coordination

Name	Department
ESTELLES LEAL, VICTOR	345 - Earth Physics and Thermodynamics
PONS MARTI, VICENTE	25 - Plant Biology
RENAU PRUÑONOSA, ARIANNA	356 - Botany and Geology
SORIA GARCIA, JUAN MIGUEL	275 - Microbiology and Ecology

SUMMARY

This subject deals with polluting processes on living beings and ecosystems in a multidisciplinary way thanks to the participation of lecturers specialised in each of the aspects it deals with. It is a compulsory subject that is situated in the first four-month period of the Master's degree. The subject is divided into 6 parts according to its content: atmospheric processes, processes on marine and continental aquatic ecosystems, polluting processes in humans, soil formation and degradation processes, and anthropic effects on the dynamics of natural systems (fluvial, alluvial, coastal systems, 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

OUTCOMES

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

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- 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 communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- 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 transmitir ideas, problemas y soluciones y de comunicarlas a una audiencia profesional y no profesional.
- Capacidad para el trabajo multidisciplinar en equipo y la cooperación.
- 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.
- Saber utilizar las diferentes fuentes bibliográficas y bases de datos biológicos y usar las herramientas bioinformáticas.
- Desarrollo de un compromiso ético y capacidad de participación en el debate social.
- Reconocimiento, respeto y promoción de los derechos humanos fundamentales, especialmente los de igualdad, de los valores democráticos y de los valores propios de una cultura de paz.
- Comprender los mecanismos de toxicidad de contaminantes.



- Diseñar bioensayos de ecotoxicidad en suelos y aguas.
- Conocer los mecanismos desarrollados por los organismos para la resistencia a la contaminación ambiental.
- Diseñar y ejecutar programas para la prevenir la contaminación del medio acuático continental y del litoral.
- Valorar integralmente del estado de salud del medio ambiente.
- Realizar ensayos del ciclo de vida.
- Saber catalogar y evaluar recursos biológicos.
- Diseñar planes de biorremediación.
- Conocer los procesos responsables del funcionamiento de los sistemas fluviales y litorales y desarrollar la capacidad de evaluar las actuaciones antrópicas en esos medios así como poder presentar soluciones de recuperación de los mismos.
- Conocer la estructura y dinámica de las poblaciones.
- Conocer los flujos de energía y ciclos biogeoquímicos en los ecosistemas.
- Valorar los efectos del cambio climático.
- Evaluar riesgos para la salud humana.
- Modelizar redes de vigilancia medioambiental.
- Evaluar el estado ecológico de los ecosistemas acuáticos epicontinentales.
- Interpretar el paisaje y restaurar hábitats.
- Planificar la explotación racional de los recursos naturales renovables terrestres y acuáticos.
- 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. CONTAMINANT PROCESSES

- 1.Noise pollution, radioactive pollution, chemical and dynamic pollution, greenhouse effect and climate change.
- 2.Geodynamics of external geological natural systems; alluvial and fluvial systems, lagoons, wetlands, karst, beaches, barrier islands and alluvial fans. Dynamics of inland (surface and ground) and marine waters. Description of environments and sub-environments. Anthropic effects on the dynamics of natural systems.
- 3.Health processes caused by various exposures to environmental pollutants. Environmental health from an epidemiological perspective, paying special attention to methodological aspects and design models relevant to the field of environment and health.
- 4.Pollution and degradation processes in marine ecosystems related to the increase in temperature, salinity, acidification, eutrophication, chemical composition and alteration of biogeochemical cycles.
- 5.Physical and chemical soil degradation processes. Soil erosion and compaction, surface crusting. Salinisation, sodification and alkalinisation.
6. Processes pollution processes of inland aquatic ecosystems

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	90,00	100
Attendance at events and external activities	5,00	0
Study and independent work	80,00	0
Preparation of evaluation activities	30,00	0
Preparation of practical classes and problem	15,00	0
TOTAL	220,00	



TEACHING METHODOLOGY

- Master class for acquiring the fundamental knowledge, including methodological aspects.
- Students will work in groups (of 2 or 3 people) on specific subjects proposed by the lecturer, finally showing their results in an oral presentation to the rest of the class. Optional.
- 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

SE1 - Evaluación continua del estudiante en las clases de teoría, laboratorio y seminarios: asistencia participativa, manipulación del material y equipos, organización del trabajo, comprensión y empleo del guión de prácticas, realización de cálculos, trabajo en equipo, etc.

SE2 - Evaluación de las actividades no presenciales relacionadas con las clases de laboratorio: memorias y/o informes de las prácticas entregados.

SE3 - Exámenes escritos sobre las clases teóricas y/o prácticas: basados en los resultados de aprendizaje y en los objetivos específicos de cada asignatura.

SE4 - Asistencia a tutorías para la realización del trabajo y/o asistencia participativa a curso/s programado/s para el fomento de las competencias transversales.

SE5 - Elaboración de una memoria sobre las actividades realizadas para el fomento de las competencias transversales

The Contaminant Processes exam will take place in January of the current course and will consist of 6 parts. The value of each is as follows:

Atmosphere (25%)

Geology (15%)

Marine Ecosystems (15%)

Ecology (15%)

Human (5%)

Soils (25%)

In order to be able to average the grades of the different subjects, at least a 4 out of 10 must be obtained in each of the parts. The pass mark for the subject is 5 out of 10.



REFERENCES

Basic

- SEGAR, D.A. (1998): Ocean Sciences. London, Wadsworth Publishing Company, 497 p.
- Appelo CAJ and Postma D (2005). Geochemistry, Groundwater and Pollution. Ed. Balkema. 2^o ed. ISBN: 10- 0415364280
- Ward AD and Trimble AW (2003). Environmental hydrology. Second edition. Lewis publishers. ISBN 1-56670-616-5
- Morell I, Renau-Pruñonosa A (2019). Contaminación de aguas subterráneas. Algunos ejemplos. (Groundwater pollution. Some cases studies). Revista Enseñanza de las Ciencias de la Tierra, 27 (1). ISSN: 1136-9157
- Gleick PH (1993). Water in Crisis: a guide to the world's fresh water resources. New York, Oxford University Press. ISBN: 0-19-507627-3
- Romera Castillo C (2022). Antropocéano: cuidar los mares para salvar la vida. Espasa Libros. ISBN: 9788467065855
- Orozco Barrenetxea, Carmen, 2002. Contaminación ambiental: una visión desde la química. Ed. Paraninfo.
- Esperter Alemany, V., López Jiménez, P. A., 2004. Dispersión de contaminantes en la atmósfera. ISBN 9701509897. Ed. McGraw Hill
- IPCC (Intergovernmental Panel on Climatic Change), 2013. Climate Change 2013: The Physical Science Basis. (<http://www.ipcc.ch/>)
- Adriano, D.C. (1986): Trace elements in the terrestrial environment. New Springer Verlag. New York
- Kabata-Pendias, A. and Pendias, H. (1992): Trace elements in soils and plants. CRC Press. London.
- Nebel, B. J.; Wrigth, R. T. (1999): Ciencias ambientales. Ecología y desarrollo sostenible. Prentice Hall hispanoamericana. México.
- Porta, J.; López-Acevedo, M. y Roquero, C., (2003): "Edafología para la agricultura y el medio ambiente". Mundi-Prensa. Madrid.
- Tan, K. H. (2000): Environmental Soil Science. Marcel Dekker. New York.
- Yaron, B. et al.(1996): Soil Pollution. Processes and Dynamics. Springer-Verlag. Berlin. Heidelberg.