

25217 - Environmental toxicology and public health

Información del Plan Docente

Academic Year	2018/19
Subject	25217 - Environmental toxicology and public health
Faculty / School	201 - Escuela Politécnica Superior
Degree	277 - Degree in Environmental Sciences
ECTS	6.0
Year	2
Semester	First Four-month period
Subject Type	Compulsory
Module	---

1.General information

1.1.Aims of the course

The subject and its expected results meet the following approaches and objectives:

It is intended that students learn to understand and analyze the possible causes and environmental factors affecting human health and its effects, and the means for evaluation and forms of action within the environmental sciences that are aimed at improving individual health and community.

1.2.Context and importance of this course in the degree

Being the indispensable interdisciplinary approach to develop the core competencies of basic professional profiles of graduates in Environmental Sciences, this approach should always integrate health perspective, both for conducting environmental assessments and to implementation of projects and environmental plans, coordination environmental management in enterprises and institutions, and planning and awareness projects, environmental education and information.

The agenda of the subject interacts with the subjects of "Society and territory", "Land degradation and soil contamination", "Waste Management and Recovery", "environmental audits", "radioactive pollution, noise and vibration"; The knowledge acquired in the course serve the subjects of "Air Pollution", "Water Pollution", "Environmental Impact Assessment" and the optional "Environmental Chemistry".

1.3.Recommendations to take this course

This subject is offered in the [English Friendly](#) form.

It is highly recommended attendance at both theoretical and practical sessions and devote sufficient time to study, in consultation with faculty doubts. The study of the matrix titration degree in Environmental Sciences, shows that: It is recommended to have taken and passed the first year courses "Chemical Bases of the Environment", "Biology" and "Statistics".

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Computer skills at user level for finding information via the Internet, the consultation of bibliographic databases and standard management of the teaching platform required.

It requires the level of English is sufficient to address the search, evaluation and synthesis of scientific articles without difficulty.

2. Learning goals

2.1. Competences

To pass the course, students will be more competent to ...

Generic competences:

1. Oral and written communication.
2. Develop management skills of information.
3. Apply knowledge in practice.
4. The search, analysis and reporting.
5. Capacity for analysis and synthesis.
6. Capacity-making consistent decisions.
7. To develop skills of personal commitment.
8. Teamwork, interpersonal skills development.
9. Develop independent learning and critical reading.

Specific competences:

1. Acquisition of basic knowledge on Toxicology, Environmental Toxicology and Ecotoxicology, public health measures, prevention and control.
2. Planning toxicity test.
3. integrated health, hygiene and occupational risk prevention management.
4. Prepare studies of urban environmental quality, introducing them the perspective of Public Health.
5. Evaluation and monitoring of the health impact of pollution.
6. Development of environmental epidemiology studies.

2.2. Learning goals

The student, for passing this subject, should demonstrate the following results ...

1. Explain the basics and the most important aspects of environmental toxicology applied to predicting the effects of toxic pollution on environmental and human health.
2. Design toxicity tests and be able to solve problems toxicokinetics, risk assessment, exposure assessment, dose-response and characterization of toxicological risk.
3. Define the fundamentals and basic concepts of public health and, within it, of Environmental Health.
4. Differentiate the main interactions between the environment and human health and major risk factors for human health present in a given environment.
5. Define the fundamentals and basic concepts of epidemiology and differentiate types of epidemiological studies the field of environmental epidemiology are used.
6. Solve calculation and interpretation of the different descriptive and analytical epidemiological parameters: incidence, prevalence, relative prevalence ratio, relative risk, attributable risk, odds ratio, risk etiologic fraction.
7. Locate and manage Health Information Systems and systems of health indicators. Being able to define and calculate health indicators.
8. Find scientific evidence in bibliographic databases on the Internet in the field of environmental health and be able to

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perform a reading and critical analysis of them.

9. Being able to explain and argue orally and in writing fundamentals, materials and methods, results and conclusions of practical work and literature searches.

2.3.Importance of learning goals

These learning outcomes have a very important application in the practice of the profession because they provide the minimum essential for health education in environmental science graduate to integrate health variables in the diagnosis, interpretation and environmental management.

The graduate in environmental science should be able to find scientific evidence and apply the techniques and working procedures of toxicology and Public Health to resolve issues and problems on health grounds in relation to the environment that are presented in the development of their profession.

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that it has achieved the intended learning outcomes through the following evaluation activities

It will conduct a comprehensive assessment test according to the schedule of the EPS for both official calls. This subject is not continuous assessment is carried out but parts 3 and 4 of the evaluation can be released during the semester.

Evaluation activities that comprise the global test are as follows:

1. Written exam on theoretical knowledge of the subject, which will consist of two parts: The first part consists of 50 multiple-choice questions and the second will consist of 5 short answer questions.

You need to get at least 5 out of 10 in this theoretical examination, otherwise the subject will be suspended.

This theoretical exam accounts for 50% of the final grade for the course.

2. Written examination of problem solving and practical exercises, to be held simultaneously with the theoretical examination.

You need to get at least 5 out of 10 for averaging with the rest of the evidence, otherwise, the subject will be suspended. This note represents 20% of the final grade for the course.

3. Submit an individual written work on Internet search through scientific information in databases of medicine based on evidence related to environmental pollutants and human health, including reading and interpretation of one of the scientific articles located.

This paper is written delivery deadline day of the theoretical test at the time of accessing the test.

You need to get at least 5 out of 10 for averaging with the rest of the evidence, otherwise, the subject will be suspended.

The mark obtained in the correction of written work accounts for 20% of the final grade for the course.

4. Conduct and orally present a group work on exposure to toxic substances and their effects (carcinogenicity, mutagenicity, teratogenicity).

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Although it is a task performed in a group, individual members may get different ratings. Delivery and oral defense of group work will take place in advance the rest of the assessment tests, in one of the two possible dates according to the planned schedule for practical activities. If unable to attend the session oral defense of the work, the affected student must submit an addendum report expansion of group work as directed by the teacher, with the deadline day of the theoretical test at the time to access the exam.

You need to get at least 5 out of 10 for averaging with the rest of the evidence, otherwise, the subject will be suspended. This note represents 10% of the final grade for the course.

If the minimum requirements are not met (exceed 5 in any of the tests 1, 2, 3 and 4) the subject is not considered approved if the final qualification (FQ), according to the indicated weighting is equal to or greater than 5.

So that:

If CF greater than or equal to 4, the final grade will be: Failed, 4.

If CF less than 4, the final grade will be: Failed, FQ.

Parts 3 and 4 of this assessment to obtain a grade of 5 or higher may be reserved for the next call. The student can choose whether to maintain the qualification obtained or resit the appropriate option in the following calls, in which case the rating will remain the most recent call.

The student who has failed to pass the course on first call, second call must repeat those activities which has not passed. To pass the test 4 in second call, the affected student must submit an addendum report expansion of group work as directed by the teacher, with the deadline day of the theoretical test at the time of accessing the test.

Evaluation criteria

In written examinations type test and assess problems: mastery of the basics of the subject; the use and accuracy in the calculation of rates and indicators, and the ability to relate the concepts learned in practice with the theoretical concepts.

In the work (individual and group) will be assessed: The clear presentation of objectives, methodology and results; the ability of critical analysis of the information obtained and to obtain appropriate conclusions; the order; the correct written expression, and the ability to respond to questions raised during the presentation to the teacher and the rest of the course.

Overall evaluation

Summarizing the above, the final grade of 10 (taking into account the restrictions specified above) will be obtained using the following formula:

Final Score = 50% note theory test (if 5 or more) + 20% note problems and practical exercises (if 5 or more) + 20% note written work individually (if 5 or more) + 10% note group work (if 5 or more).

4. Methodology, learning tasks, syllabus and resources

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4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, supervised work and group work.

A) Teaching Methods

1) The exhibition method, which is characterized by communication of theoretical contents by the teacher. This method is preferably used when students do not have prior knowledge that allow participatory development.

The structure of expository method is:

1. Motivation.
2. Initial information.
3. Following arguments.
4. Consequences or conclusions

2) The demonstrative method, in which the teacher intends to teach students through demonstration of a coordinated task or protocol.

The structure of demonstrative method is:

1. Preparation of the student.
2. Explanation of the task.
3. Carrying out the work or protocol by the teacher.
4. Performance of the student.

B) Methods of student learning

The recommended method is mainly for student development, whose two fundamental aspects are:

- Interrogative method, the teacher asks questions to guide students to shuttle in the discovery of content. This type of methodology increases the stimulation of student practical learning processes. The development of the questions will be prior to class attendance and both open and closed questions will be used, all aimed to promote an individual learning process.
- Active method, in which the student becomes the subject agent of his own formation through personal research, direct contact with reality and experience with the working group in which it is incorporated.

This method is based on:

- A strong motivation for learning,
- An increase of increasing difficulty.
- This is creating a bridge between theoretical academic abstraction and practical reality.
- Facilitates auto-detection of errors.
- Facilitates personal autonomy student
- Develops skills acquisition and information search skills and research

The development of assignments and later oral presentation to the rest of the class is to encourage students in:

- The search and selection of relevant literature according to their scientific-technical rigor distinguishing between literature referenced and that of doubtful origin.
- The self-learning students, ie they are able to learn to learn by themselves, know where to find literature or relevant databases related to environmental toxicology and public health. The development of this skill is very important for

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later professional life.

- The ability to present an orderly and rigorous work done.

Teamwork is coordinated effectively with division of tasks and compliance with the position taken by each group member.

4.2.Learning tasks

This course is organized as follows:

- **Lectures** to convey the offered topics of the course.
- **Practice sessions:** problem-solving and cases
- **Assessment tasks:**
 - o **Academic supervised assignments**, active search sources of scientific information over the Internet still needed in some cases.
 - o **Group work** and oral presentation: Fundamentals, objectives, methodology, results and discussion.

4.3.Syllabus

This course will address the following topics:

Theory	Practice sessions
1.- Principles of Toxicology 2.- Absorption, distribution and excretion of poisons. Metabolism of poisons.Toxicokinetics	Problem solving.
3.- Poisons and cancer. Mutagenesis. Teratogenesis.	Bibliographic searches on the internet about poisons and cancer, mutagenesis and teratogenesis
4.- Tests for toxicity and evaluation of toxicological risk. Identification of the dangers.	Bibliographic searches on the internet about poisons and cancer, mutagenesis and teratogenesis
5.- Evaluation of the exposure.Relation dosage-response	Problem solving and case studies. Setting up of group work.

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<p>6.- Characterization of the risk</p> <p>7.- Principal environmental contaminants and effects on human health</p>	<p>Problem solving and case studies.</p> <p>Setting up of group work.</p>
<p>8.- Health and its determinants. The Environment and health.</p> <p>9.- The European Environment and Health Strategy.</p>	<p>Bibliographic searches on the internet about environmental contaminants and health.</p>
<p>10.- Public Health. Historical background and the current concept.</p>	<p>Bibliographic searches on the internet about environmental contaminants and health.</p>
<p>11.- Health demography. Health Information Systems.</p>	<p>Presentation of group work.</p>
<p>12.- Introduction to Epidemiology. Measurement of health and illness phenomena.</p>	<p>Presentation of group work.</p>
<p>13.- Epidemiological research. Phases and types of studies. Descriptive studies, cohort studies, case and control studies, experimental studies.</p> <p>Chance. Biases.</p>	<p>Problems of measures and risks. Practical about Health Information Systems.</p>
<p>14.- Systematic reviews and meta-analysis. Medicine based on the evidence.</p>	<p>Problems of epidemiology.</p>

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Group work											
Tutorials ECTS				1							
Assessment								1			
Non face-to-face											
Autonomous work	4	4	3	2	1	3	8	3	2,5	4	
Group work			1	1	3	1			1,5		
TOTAL	8										

Type of activity / Week	12	13	14	15	16	17	18	19	20	Total
Face-to-face										64
Theory	2	2	2	2	2					30
Problems			2	2	2					26
Laboratory practices										2
Group work										0
ECTS Tutorials										1
Assessment								4		5
Non face-to-face										86
Individual work	6	6	4	4	4	7	7	4		77
Group work	1,5									9
TOTAL	8	8	8	8	8	7	7	8		150

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Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website and Moodle.

4.5. Bibliography and recommended resources

- BB** Manual de epidemiología y salud pública para grados en ciencias de la salud / directores, Ildefonso Hernández- Aguado ... [et al.] ; coordinadora de la edición, Blanca Lumbreras Lacarra . 2ª ed. Buenos Aires ; Madrid [etc.] : Editorial Médica Panamericana, D.L. 2011
- BB** Medicina preventiva y salud pública / directores, Antonio Sierra López ... [et al.] ; directores asociados, Fernando Rodríguez Artalejo ... [et al.] . 11ª ed. Barcelona [etc.] : Masson, 2008
- BB** Moreno Grau, María Dolores. Toxicología ambiental : evaluación de riesgo para la salud humana / María Dolores Moreno Grau Madrid [etc.] : McGraw-Hill, D.L. 2003
- BB** Repetto, Manuel. Toxicología fundamental / Manuel Repetto Jiménez, Guillermo Repetto Kuhn . - 4ª ed. Madrid : Díaz de Santos, 2009
- BC** Capó Martí, Miguel Andrés. Principios de ecotoxicología : [Diagnóstico, tratamiento y gestión del medio ambiente] / Miguel A. Capó Martí Madrid : Tébar, D.L.2007
- BC** Epidemiología : diseño y análisis de estudios / editor Mauricio Hernández Avila . México, D.F. [etc.] : Editorial Médica Panamericana, cop. 2007
- BC** Klaassen, Curtis D.. Fundamentos de toxicología / Curtis D. Klaassen y John B. Watkins . Madrid [etc.] : McGraw-Hill Interamericana, D.L. 2005
- BC** Lilienfeld, Abraham M.. Fundamentos de epidemiología / Abraham M. Lilienfeld, David E. Lilienfeld ; versión española de Carlos Luis González Wilmington, Delaware [etc.] : Addison-Wesley Iberoamericana, 1988
- BC** Peña, Carlos E.. Toxicología ambiental : evaluación de riesgos y restauración ambiental / Carlos E. Peña, Dean E. Carter, Felix Ayala Fierro . Arizona : Collegue of Pharmacy, cop. 2001

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The updated recommended bibliography can be consulted in:
<http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=2174>