

Degree	Type	Year	Semester
2501915 Environmental Sciences	OB	3	2

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Other comments on languages

Most supporting documentation and related articles will be in English.

Teachers

Ferran Torres Benitez
Jordi Nadal Tera

Prerequisites

Have a basic knowledge of English.

Objectives and Contextualisation

Introduction

The subject is structured in two complementary parts.

- The first part deals with how the environment (exposure to air pollution, water quality, radiation, toxic food, etc.) can affect people's health. These are problems of growing interest that are examined from an epidemiological perspective, with special attention to the methodological aspects of risk assessment.
- In the second part of the subject, the comprehensive management of environmental risks with more immediate impacts is proposed, such as the so-called natural risks and industrial accidents, from a perspective of their social value, communication and management that is done at the Catalan, Spanish and European levels.

Subject objectives

To provide the basic elements to be able to know and study the effects on health of the environmental conditions to which people are subjected (atmospheric pollution, water quality, radiation, waste, metals, etc.). It will also provide basic knowledge of the main natural and industrial risks in our environment and their management.

The main health and environmental risk issues will be presented, as well as those of more current interest, with the specific objectives of:

1. To know the main epidemiological concepts and methods to assess the health risk of environmental factors.
2. To become familiar with the main environmental risk factors for health.
3. To provide students with tools for the understanding and discussion of epidemiological studies.
4. To know the main scientific perspectives on environmental risks that support management.
5. Contrast scientific perspectives with social perspectives.
6. To introduce students to the topic of risk communication.
7. To learn about risk prevention, emergency management and post-calamity actions with selected examples of specific hazards.

Competences

- Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
- Analyze and use information critically.
- Collect, analyze and represent data and observations, both qualitative and quantitative, using secure adequate classroom, field and laboratory techniques
- Demonstrate adequate knowledge and use the most relevant environmental tools and concepts of biology, geology, chemistry, physics and chemical engineering.
- Demonstrate adequate knowledge and use the tools and concepts of the most relevant social science environment.
- Demonstrate concern for quality and praxis.
- Demonstrate initiative and adapt to new situations and problems.
- Develop communication strategies on environmental issues, including environmental risks
- Information from texts written in foreign languages.
- Integrate environmental information in order to formulate and test hypotheses.
- Integrate physical, technological and social aspects that characterize environmental problems.
- Learn and apply in practice the knowledge acquired and to solve problems.
- Quickly apply the knowledge and skills in the various fields involved in environmental issues, providing innovative proposals.
- Teaming developing personal values regarding social skills and teamwork.
- Work autonomously

Learning Outcomes

1. Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
2. Analyze and use information critically.
3. Communicate environmental problems with proper attention to the problems of environmental risk and the relevant regulations in the fields of safety and environmental health.
4. Demonstrate concern for quality and praxis.
5. Demonstrate initiative and adapt to new situations and problems.
6. Demonstrate knowledge of some of the main areas of scientific disciplines environment.
7. Demonstrate knowledge of some of the main areas of the social sciences in the environment.
8. Identify processes sciences, life sciences and social sciences in the surrounding environment and evaluate them properly and originally.
9. Information from texts written in foreign languages.
10. Integrate environmental information with environmental knowledge acquired from the sequence of observation, recognition, synthesis and modeling.
11. Learn and apply in practice the knowledge acquired and to solve problems.
12. Learn and apply the most important epidemiological analysis of environmental risks and the overall risk analysis methodologies.
13. Observe, recognize, analyze, measure and properly and safely represent environmental processes.
14. Teaming developing personal values regarding social skills and teamwork.

15. Work autonomously

Content

The syllabus may undergo some variations depending on the academic calendar and incidents of each course. Basically, the topics to be covered are:

1. Presentation of the subject. Health in the management of environmental risk. Introduction to environmental epidemiology, concepts of public health.
2. Principle of precaution and risk assessment for health. Evaluation of carcinogens in humans by IARC.
3. Measure of disease effect. Incidence, prevalence, rates and attributable risk. Sources of information
4. Measure of exposure. General concepts and measures in the environment. Questionnaires and biomarkers.
5. Types of epidemiological studies for the description and evaluation of causal associations between exposure and disease.
6. Case studies and controls.
7. Cohort studies. Relative risk
8. Bias, factors of confusion and stratification. Causal criteria.
9. Exposure to organochlorine compounds.
10. Water pollution
11. Atmospheric pollution. Main pollutants and acute and chronic effects.
12. Electromagnetic fields: ionizing and non-ionizing radiation and its effects on health.
13. Climate change and health.
14. Introduction to the integral management of environmental risk: definition, classifications and measures.
15. Environmental risk and impacts in the current world.
16. The perception of risk
17. The communication of risk
18. Risk, vulnerability and distributive justice.
19. Flooding Case study of the Rubí stream.
20. Extreme weather phenomena.
21. Drought
22. Earthquakes
23. Technological risks. Industrial risk

Methodology

Supervised activities

- Theoretical classes (TE). Each thematic block will begin with one or more face-to-face theory classes where the teacher will explain the key concepts, encourage interaction and discussion of doubts, and give guidelines for monitoring and preparation of complementary autonomous activities.

The support teaching material will contain the essential contents of the theoretical classes, will be available in advance on the Virtual Campus of the subject, and it is recommended that students have it available during the class (computer, tablet or paper format) to facilitate its monitoring.

- Classroom practices (PAUL). The practical classes will consist of the study of cases in which the concepts introduced in the theoretical classes will be put into practice. Some practical exercises can be individual and others in groups according to the instructions of the teacher. The practices will be evaluated and are mandatory to pass the course.
- Field practices (PCAMP). There will also be field trips to deepen the knowledge of a topic. These practices will complement the training received, representing an essential aspect of the subject and attendance is mandatory.

Autonomous activities

- Self-study tests with feedback will be provided, using the questionnaire utilities of the Moodle classroom of the virtual campus of the subject, to facilitate the review of the subject synchronized with the teaching of the syllabus.
- Group and individual work. Several practical works will be carried out, some in teams, where it will be tried to apply the knowledge approaching a real situation supervised by the teacher. It will be necessary to solve problems raised in which it will be necessary to consult several sources. The ability to work in groups or individually (as applicable), reasoning and experience of the student in solving problems related to the professional field will be promoted.
- Personal study. An individual effort will be necessary to settle the theoretical classes and the knowledge of the practical part.

Tutorials and personal attention to students

Students are expected to attend classes and consult doubts by actively participating in them. However, you can consult with the professors using the virtual campus and the e-mails indicated in the teaching staff.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom Practices	20	0.8	2, 11, 12, 3, 5, 4, 10, 13, 9, 1, 15, 14
Field trip	15	0.6	3, 10
Theoretical	45	1.8	2, 11, 12, 3, 4, 10, 13
Type: Autonomous			
Practices and informs redaction	65	2.6	2, 11, 12, 3, 5, 4, 10, 13, 9, 1, 15, 14
Self-learning tests	8	0.32	2, 11, 12, 3, 6, 7, 8, 10, 13, 1
Study	70	2.8	2, 11, 12, 5, 4, 10, 9, 15

Assessment

The marks for each of the two parts of the subject (Environmental Epidemiology and Risk Management) will be assessed taking into account the weights and criteria discussed below in this section. If the criteria for averaging are met, then the final mark for the subject will be the average of the two parts (50% weighting for each part). Otherwise, it will be necessary to recover the affected activities in order to average the two grades. A minimum of 5 points out of 10 is required to pass the course.

To assess the degree of achievement of the competences, the following instruments and weightings will be used:

Exams

There will be two partial exams of the theoretical part, one for each part of the course. The theory part is worth 40% of the overall mark for the course. The minimum mark for weighting is 3.5 out of 10.

These activities are compulsory. In order to have access to the recovery it is necessary to have done 80% of the evaluable activities, and to have taken the 2 partial exams.

Practical work and field activities

These activities are compulsory, both in terms of attendance and delivery. You must have at least a grade of 3.5 in each of the activities, otherwise it will be necessary to recover the affected activities. Practical activities are worth 40% of the overall mark for the course.

Deliveries after the deadline:

- The late delivery of the activities will imply a penalty of 20% of the obtained mark.

These activities are mandatory. The deliveries of the works are recoverable but not the attendance, which must be at least 75%. Otherwise, these activities may be penalized proportionally to the lack of attendance.

Self-study activities

They will have a weight of 10% provided that at least 80% of these activities have been carried out, otherwise the mark for this part will be a zero. There is no minimum mark for these activities.

Deliveries after the deadline:

- The delivery of these activities late and up to 48 hours after the deadline, will imply a penalty of 20% on the grade obtained.
- The late delivery of activities after this 48-hour margin will mean that they will be counted as not having been completed for the evaluation.

These activities are not mandatory, but they are not recoverable either.

Continuous training and evaluation

It is reminded that the evaluation will be made according to the contents commented by the teacher in class, and that, therefore, attendance in person is highly recommended since not all the information will be accessible on the virtual campus.

In addition, during the course there will be a continuous assessment and it will be necessary to have participated in 80% of these assessment activities for them to be weighted at 10%, otherwise the mark for this part will be a zero. Standard teaching innovation tools will be used to control class participation. There is no minimum mark for these activities.

These activities are not mandatory, but they are not recoverable either.

Summary of criteria and weights for the evaluation of the subject

	Participation ¹	minimum Participation ²	minimum Mark ³	Exercise recoverable ⁴	Weighting ⁵
Partial Exams	Compulsory	100%	3.5	Compulsory	40%
Practical activities					
Deliveries	Compulsory	100%	3.5	Compulsory	40%
Attendance	Compulsory	≥75%	NA	Unrecoverable	*

Self- study	Volunteer	≥80%	NA	Unrecoverable	10%
Continued appraisal	Volunteer	≥80%	NA	Unrecoverable	10%

NA: Not applicable

1: Compulsory participation implies that non-participation will have to be recovered (except for attendances) in order to be weighted, and if it is not done, it will not be possible to average, and therefore the subject will not be approved either. Voluntary participation implies that it is not compulsory but that it cannot be recovered later.

2: Value of minimum participation to weight, otherwise the activities will count as 0.

3: Minimum mark of 10 points to be weighted with the rest, if the minimum is not reached, the specific activity will have to be recovered, regardless of the rest of the marks of the same type

4: When the activity is recoverable, it must be recovered if the minimum mark is not obtained. In case of non-recoverable activity, the mark cannot be recovered, and therefore it will be weighted to the final mark, even if it is 0 or less than any threshold.

5: Weight value if the previous criteria are met

**: For participations of less than 75%, practical activities may be penalized in proportion to the lack of attendance*

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exam	40%	2	0.08	2, 11, 12, 6, 7, 8, 13, 1
On-site continuous assessment during classes	10%	0	0	2, 11, 12, 6, 7, 4, 8, 10
Practices and field trip	40%	0	0	2, 11, 12, 3, 6, 7, 5, 4, 8, 10, 13, 9, 1, 15, 14
Self-learning activities	10%	0	0	2, 11, 12, 3, 6, 7, 8, 10, 13, 15, 14

Bibliography

Bigliography

- Baker D. i Nieuwenhuijsen MJ. Environmental Epidemiology. Study methods and application. Oxford University Press (disponible a la biblioteca de ciències)
- Nieuwenhuijsen MJ. Exposure assessment in occupational and environmental epidemiology. Oxford University Press. (disponible a la biblioteca de ciències)
- Martínez-Navarro F., Antó JM, Castellanos PL, Gili M, Marset P, Navarro V., ed. Salud Pública. Madrid: Mcgraw-Hill- Interamericana de España S.A.U. 1998 ; cap. 15: 261-71. (disponible a la biblioteca de Ciències)
- Antó JM, Sunyer J. La epidemiología ambiental. En: Martínez-Navarro F., Antó JM, Castellanos PL, Gili M, Marset P, Navarro V., ed. Salud Pública. Madrid: Mcgraw-Hill- Interamericana de España S.A.U. 1998 ; cap. 15: 261-71. (disponible a la biblioteca de Ciències)

- Ayala Carcedo, F.J. y Olcina Cantos, J. (eds) (2002): *Riesgos Naturales*. Barcelona: Ariel
- Calvo García-Tornel, F. (2001): *Sociedades y Territorios en Riesgo*. Barcelona, Ediciones del Serbal.
- Llasat, M.C. i Corominas, J. (2010): Riscos associats al clima, a J.E. Llebot (ed): Segon Informe sobre el Canvi Climàtic a Catalunya. Barcelona: Institut d'Estudis Catalans i Consell Assessor per al Desenvolupament Sostenible de la Generalitat de Catalunya.
<http://www15.gencat.cat/cads/AppPHP/images/stories/publicacions/informesespecials/2010/sicccat/inform>
- Smith, K. i D. Petley (2009): *Environmental Hazards. Assessing risk and reducing disaster*. Londres, Routledge (5ena edició).
- Vilaplana, J.M. (2008) RISKCAT. Els riscos naturals a Catalunya. Barcelona: Consell Assessor pel Desenvolupament Sostenible
http://www15.gencat.net/cads/AppPHP/images/stories/publicacions/informesespecials/2008/els_riscos_na
- Kieffer, Susan W. 2013: *The Dynamics of Disaster*. New York: Norton.

web links

WHO - OMS Organització Mundial de la Salut

<http://www.who.int/es>

Agència Europea del Medi Ambient

<http://www.eea.eu.int>

Programa de les Nacions Unides pel Medi Ambient

<http://www.unep.org/>

US Environmental Protection Agency

<http://www.epa.gov>

International Society for Environmental Epidemiology

<http://www.iseepi.org/>

WFP_ Programa Mundial d'Aliments

<http://www.wfp.org/>

European Centre for Environment and Health

<http://www.euro.who.int/ecehrome>

Publicacions de la UE. Sovint hi ha publicacions disponibles en pdf sobre salut i medi ambient

<http://bookshop.europa.eu/>

Agència internacional d'avaluació del càncer

<http://www.iarc.fr>

Natural Hazards Center

<http://www.colorado.edu/hazards>

Centre for Research on the Epidemiology of Disasters

<http://www.cred.be/>

Estratègia Internacional per a la Reducció de Desastres

<http://www.unisdr.org>

Protecció Civil Espanya

<http://www.proteccioncivil.org>

Direcció General de Protecció Civil (Catalunya)

<http://www20.gencat.cat/portal/site/interior/>

Consortio de Compensación de Seguros

<http://www.conorseguros.es>

Software

Use of standard office software and pdfs documents