Universidad de Navarra

Environmental risks

Guía docente 2026-27

PRESENTACIÓN

Course description:

Natural hazards, like natural resources, are part of the offering of our natural systems. From the last century, there has been an increasing awareness of risk in the environment coupled to a growing concern about the continuing potential damage caused by natural hazards. In fact, everyday headlines and news show reports of the devastation that nature brings to human lives and property. Earthquakes, volcanoes, storms, hurricanes, intense precipitations and floods, droughts, landslides, heat waves, cold spells, thunderstorms or cyclones are part of these forces of the natural world that can cause significant risks on society and its economies. In this course, we will study the fundamental science behind the occurrence of these extreme natural events to understand their causes, risks and impacts. Afterwards, we will examine different management and mitigation strategies that are developed to minimize the threats posed by known environmental hazards. In order to meet these objectives, theoretical classes will be combined with the analysis of case studies.

- **Degree**: Environmental Sciences
- **Module**: Module VIII. Optional
- **ECTS**: 3
- **Year, Semester**: Third, First
- **Type of course**: Elective
- **Professor**: Sheila Izquieta Rojano
- **E-mail**: sizquieta@unav.es
- **Language**: English
- **Classroom, Time**: Check calendar, Tuesday 16-19h and Wednesday from 13:30-15h

RESULTADOS DE APRENDIZAJE (Competencias)

- **CB2** Students must be able to apply their knowledge to their work or vocation in a professional manner and have the competencies usually demonstrated through the elaboration and defence of arguments and solving problems within their field of study.
- **CB3** Students must develop the ability to gather and interpret relevant data (usually within their area of knowledge) in order to make judgments that include a deep reflection on relevant social, scientific or ethical issues.
- **CB4** Students must be able to transmit information, ideas and solutions to both a specialized audience and the general public.
- **CG2** Think in an integrated manner and tackle the problems from different perspectives.
- **CG3** Development of critical thinking.
- **CG5** Develop a sense of responsibility towards the Environment and the Ecosystems.
- **CG6** Managing the information properly.

PROGRAMA

- **Theoretical program (16h)**
  - Block 1.
    - Introduction Hazard in the environment.
    - Introduction to hazard, vulnerability, exposure and risk concepts.
    - Natural disasters.
    - Economic and social impacts.
    - Risk assessment and management.
    - Mitigation and adaptation strategies.
  - Block 2. Main natural hazards

    - Tectonic hazards: Earthquakes, tsunamis and volcanoes.
    - Mass movement hazards: Landslides and avalanches.
    - Atmospheric hazards: cyclones, hurricanes, thunderstorms and lightning.
    - Hydrological hazards: floods and droughts.
    - Weather extremes hazards: heat waves and cold spells.
    - Wildfires.
- **Practical program**
    - Case studies (8h)
    - Field trip (6h)

ACTIVIDADES FORMATIVAS

- **Lectures**

Lectures are given by the professor on the themes indicated in the program with the help of the blackboard and PowerPoint presentations. During the classes, active participation of students is expected. All the necessary material will be posted on ADI by the profesor.

- **Case studies (required)**

During the course, a number of natural disasters will be analyzed. The practical classes will be organized as follow: Presentation by the professor of an example of a case study. Evaluation and discussion of the data by the students. Analysis of different case studies by students. The case studies will be prepared as part of the personal work and the results will be presented in class (short oral presentations). After each presentation, and guided by the professor, the Students will evaluate and discuss the results presented by their classmates. Attendance to practical lessons is required.

- **Field trip**

Students will visit a specific location in Navarra in order to analyze past and present environmental risks in the área.

- **Teamwork**

The Students will carry out a critical report on the main aspects addressed during the field trip. The main results of this report will be shown in an oral presentation. Attendance to the oral presentation is required.

- **Personal work**

Students must understand themes covered early in the course to be able to comprehend information presented later in the course, and will have to be able to integrate material learnt throughout the course. Therefore, it is important that they do not fall behind and try to set aside regular times outside of class to work on the course material on a daily basis. To do so, Students should conduct a personal study using notes taken in lectures and recommended books if needed. Moreover, they will need to understand and handle different concepts to be able to actively participate in the case studies.

- **Personal interviews**

If required, students may have personal interviews with the professor to help him/her with personal study and learning.

EVALUACIÓN

ALUMNOS CON NECESIDADES ESPECIALES: los estudiantes con necesidades educativas especiales deberán ponerse previamente en contacto con la Coordinación de Estudios de la

Facultad de Ciencias para obtener la autorización correspondiente a las adaptaciones (por ejemplo, disponer de más tiempo en los exámenes). Dicha autorización deberá ser enviada por el alumno al profesor. Se recomienda realizar esta gestión al comienzo del cuatrimestre.

ATENCIÓN: Se recuerda que cualquier intento de fraude, copia, plagio u otro comportamiento irregular supone una infracción grave, tal y como está contemplado en el título IV "Normas de disciplina académica de los estudiantes" dentro del Sistema de normas sobre la convivencia en la Universidad de Navarra.

CONVOCATORIA ORDINARIA

In order to assess the successful accomplishment of the course objectives, the theoretical part will be graded with a final exam. It will include short questions and multiple choice questions and test cases. It corresponds to 50% of the final mark.

The practical part will have two parts: 1) Preparation and presentation of the analyzed case studies (80%); 2) Preparation and presentation of the teamwork (20%).

The sum of the two practical parts will account for 50% of the final mark. To pass the course it is required that the students pass both parts (theoretical and practical parts).

CONVOCATORIA EXTRAORDINARIA

To pass the course it is required that the students pass both parts (theoretical and practical parts).

HORARIOS DE ATENCIÓN

Dra. Sheila Izquieta Rojano (sizquieta@unav.es)

- Office: 2D20; Building: Hexágono; Floor: 2.
- Tutoring hours: Please, use the e-mail address to contact the professor and make an appoinment.

BIBLIOGRAFÍA Y RECURSOS

No compulsory text is designated for the course. It is recommended that the student choose a basic text, with a simple and didactic structure, or a more complete and detailed reference manual, depending upon the interest of each student to comprehensively understand the subject matters.

- **Main materials:**
  - Class notes.
  - Material provided during the theoretical and practical classes.
  - Audio-visual material of the professor
- **Recommended resources:**
  - Smith, K. Environmental Hazards: Assessing Risk and Reducing Disaster. Routledge, Taylor & Francis Group. London and New York. 2013. Find it in the Library.
  - Penna, A.N. and Rivers, J.S. Natural Disasters in a Global Environment. Chichester, West Sussex, UK: Wiley-Blackwell. 2013. Find it in the Library.
  - Hallegatte, S. Natural Disasters and Climate Change: An Economic Perspective. Cham: Springer. 2014. (electronic version) Find it in the Library.
  - Dalezios, N.R. Environmental Hazards methodologies for risk assessment and management. London: IWA Publishing. 2017. Find it in the Library (printed version).

Universidad de Navarra

- Natural Disasters: Research Starters Topics. Research Starters, EBSCOhost. 2015. Syngellakis, S. Management of Natural Disasters. WIT Presss. 2016. Find it in the (printed version) Library.
- Shi, P. and Kasperson, R.E. World Atlas of Natural Disaster Risk. Heidelberg (Germany): Springer. 2015. (electronic version) Find it in the Library.
- http://www.naturalhazards.org/ http://www.gsdrc.org/topic-guides /disaster-resilience
- https://www.oas.org/dsd/publications/unit/oea54e/ch05.
- htm https://www2.usgs.gov/natural_hazards/ https://earthobservatory. nasa.gov/NaturalHazards/