

60437 - Geohazards analysis and mitigation methods

Información del Plan Docente

Academic Year	2017/18
Faculty / School	100 - Facultad de Ciencias
Degree	541 - Master's in Geology: Techniques and Applications
ECTS	5.0
Year	1
Semester	Second semester
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

Assessment details

The student must demonstrate that has achieved the intended learning goals through the following evaluation activities:

Continuous evaluation

Activities proposed and carried out during lessons, practices and field (80% of the final grade).

60437 - Geohazards analysis and mitigation methods

reports and resolution of problems presented in practices (20% of the final grade).

Final exam

Final theoretical-practical examination for those who have not passed the course through the continuous evaluation (100% of the final grade)

5. Methodology, learning tasks, syllabus and resources

5.1. Methodological overview

Given the practical focus of this course, the learning tasks are designed for the students to acquire the basis for the identification of adequate approaches for the analysis of hazardous Earth surface processes. Students will also gain some experience on the practical application of some methods.

5.2. Learning tasks

The course includes the following learning tasks:

- 1. Lectures. They will be focused on the presentation of multiple approaches applied to the analysis of potentially hazardous Earth surface processes. Lectures will be developed in a participative way presenting the theoretical background of the methods, describing their practical application, and explaining their strengths and weaknesses. Commonly, the approaches will be illustrated by specific case studies investigated by the lecturers, some of which will be examined in the field.
- 2. Lab sessions (cabinet y computer). They consist on the solving of problems and the analysis of case studies. These practice sessions will start with brief methodological explanations aimed at introducing case studies, which will be analysed by the students under the lecture's supervision. At the end of these sessions, the students will discuss their results and hand them in to the lecturer.
- 3. Field work sessions. They will be developed in two and a half trips (a trip is equivalent to 0.8 ECTS). Geological and geomorphic evidence of active hazardous processes will be examined in the field. The students will practise some field techniques.

5.3. Syllabus

The course will address the following topics:

Topic 1: Mapping and characterization of hazardous processes

1. Geodetic tools (e.g. airborne and ground-based LIDAR, hand-held GPS, levelling instrument, DEMs).
2. Production of maps of active processes (e.g., remote-sensed imagery, LIDAR data, shaded relief models, SIG, Autocad).
3. Characterization of hazardous processes (e.g., soil erosion quantification, assessment of soil and water degradation, trenching, ground movement monitoring, shallow geophysical techniques).

Topic 2: Predictive models

60437 - Geohazards analysis and mitigation methods

1. Development and evaluation of susceptibility and hazard models
2. Direct and indirect risk models

Topic 3: Risk mitigation

1. Mitigation strategies
2. Cost-benefit analysis and risk acceptability

Topic 4: Flooding hazard. Hydrometeorological and hydraulic models

Practice sessions

- Lab sessions and Computer Lab sessions. The solving of problems and the analysis of case studies. These sessions will include practical exercises to be solved individually or in groups under the supervision of the lecturer. Students will be also asked to prepare brief presentations.
- Field practices. The fieldwork will be developed in two and a half trips (a trip is equivalent to 0.8 ECTS). The location of the visits and the topics to be addressed will be discussed with the students in order to better meet their interests.

5.4.Course planning and calendar

The course includes the following learning tasks:

- Lectures: 16 hours
- Lab sessions (cabinet and computer): 14 hours
- Field work sessions: 20 hours
- Autonomous work: 75 hours
- Total: 125

The planned schedule is depends on the approved schedule to be published in the bulletin board of the Department of Geosciences.

5.5.Bibliography and recommended resources

- Alexander, David.. Natural disasters / David Alexander . - Reprinted London : Routledge, 2002.
- Bell, Frederic Gladstone. Geological hazards : their assessment, avoidance, and mitigation / F.G. Bell London : Spon, 2003
- Coch, Nicholas K.. Geohazards : natural and human / Nicholas K. Coch Englewood Cliffs (New Jersey) : Prentice Hall, cop. 1995
- Geomorphological hazards and disaster prevention / [edited by] Irasema Alcántara-Ayala , Andrew S. Goudie Cambridge : Cambridge University Press, 2010
- Geomorphology for engineers/ Edited by P. G. Fookes, E. M. Lee, G. Milligan Dunbeath : Whittles publishing, 2005
- Keller, Edward A.. Riesgos naturales : procesos de la Tierra como riesgos, desastres y catástrofes / Edward A. Keller , Robert H. Blodgett . - [1ª ed.] Madrid : Pearson, D. L. 2007
- Riesgos naturales / Francisco Javier Ayala-Carcedo, Jorge Olcina Cantos (coordinadores) . - 1a. ed. Barcelona : Ariel, 2002