

60437 - Geohazards analysis and mitigation methods

Syllabus Information

Academic Year: 2019/20

Subject: 60437 - Geohazards analysis and mitigation methods

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.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.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 assessment

Activities proposed and carried out during theory lessons, laboratory sessions and in the field (80% of the final grade).

Reports and resolution of problems presented in laboratory sessions (20% of the final grade).

Final exam

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

4.Methodology, learning tasks, syllabus and resources

4.1.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.

4.2.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. Laboratory sessions (cabinet y computer). They consist on the solving of problems and the analysis of case studies. These lab 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 each session, the students will discussed their results and hand them in to the lecturer.
- 3. Field work sessions. They will be developed in two and a half field 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.

4.3.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

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

Laboratory and field 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.

4.4.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.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=60437&year=2019