

Course guide 310615 - 310615 - Geophysics

Last modified: 06/03/2025

Unit in charge: Teaching unit:	Barcelona School of Building Construction 748 - FIS - Department of Physics.		
Degree:	BACHELOR'S DEGREE IN GEOINFORMATION AND GEOMATICS ENGINEERING (Syllabus 2016). (Compulsory subject).		
Academic year: 2024	ECTS Credits: 4.5	Languages: Spanish	
LECTURER			

Coordinating lecturer: Carlota E. Auguet Sangrá

Others:

PRIOR SKILLS

Foundations of electromagnetism. Action of a magnetic field over a charge in movement and an element of current. Magentic fields created by different conductives.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:

1. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

TEACHING METHODOLOGY

In the hours of in-person learning classes will be alternated between explanation type classes with classes of resolution of exercises and problems. In the expositive classes, in large group, the professor does a theoretical explanation to introduce the concepts that will be worked, and carries out examples of practice application of the same ones. The exercise and problem resolution classes will be done in medium sized group, and alternate the resolution of practical exercises and problems by students and the clarification of the most problematic points by the professor. The professor also proposes to the student, both face-to-face and through the ATENEA platform, exercises and problems for autonomous learning.

LEARNING OBJECTIVES OF THE SUBJECT

Get the students used to the physic-mathematic tools necessary for the study of the typical contents of Sismology and Geomagnetism.

Introduction to the methods used for the Geophysics to access the knowledge of the Earth's interior and its dynamics.

STUDY LOAD

Туре	Hours	Percentage
Hours large group	18,0	16.00
Hours medium group	27,0	24.00
Self study	67,5	60.00

Total learning time: 112.5 h



CONTENTS

Unit 1

Description:

Introduction to Geophysics. Earth's internal structure and composition. Tectonic plates.

Full-or-part-time: 2h

Theory classes: 2h

Unit 2

Description:

Geomagnetism. Earth magnetic field: inner and outer contributions. Dipolar field. Magnetic elements and force lines.

Specific objectives: Get used to the geomagnetic coordinates

Full-or-part-time: 7h Theory classes: 4h Practical classes: 3h

Unit 3

Description: Magnetic anomalies.

Full-or-part-time: 4h Theory classes: 2h Practical classes: 2h

Unit 4

Description: Elasticity. Elastic parameters. Speed of transversal and longitudinal waves. Elastic waves and dispersive waves.

Full-or-part-time: 3h Theory classes: 1h Practical classes: 2h

Unit 5

Description:

Seismic waves. Classification. Internal waves and surface waves. Recording of seismic waves. Seismograms and accelerograms.

Full-or-part-time: 5h Theory classes: 3h Practical classes: 2h



Unit 6

Description:

Propagation of the seismic waves in a flat layer of constant velocity. Domocrones, parameter graphics of the distance-lightning epicentral.

Full-or-part-time: 4h Theory classes: 2h Practical classes: 2h

Unit 7

Description:

Generalization of the case of n layers. Continuous variation of the velocity with the depth. Relation of Benndorf.

Full-or-part-time: 2h Theory classes: 1h

Practical classes: 1h

Unit 8

Description:

Distribution of velocity waves P and S. Nomenclature of the sysmic phases.

Full-or-part-time: 1h Theory classes: 0h 30m Practical classes: 0h 30m

Unit 9

Description:

Intensity and magnitude of earthquakes. Scales of intensity and magnitude. Liberated energy by an earthquake. Risk and danger seimics.

Full-or-part-time: 3h Theory classes: 2h Practical classes: 1h

Unit 10

Description: Electrical methods of propection.

Full-or-part-time: 1h Theory classes: 1h



Carrying out tests of continuous evaluation.

Description: Carrying out tests of continuous evaluation.

Full-or-part-time: 6h Theory classes: 6h

GRADING SYSTEM

There will be 2 continuous evaluation tests that will count 25% each. The first one will take place during week 7 of the term, and the second one during week 14. There will also be a final test that will count 50%. The final grade will be the best between the weighted median and the final exam. Optional work that will raise the final grade by 5%. There will be a re-evaluation exam.

EXAMINATION RULES.

The delivery of the final exam erases the possibility of having a "not attended".

To attend the retake exam it is mandatory to have attended the final exam, and that the final mark of the subject is between 3.5 and 4.9.

The maximum qualification for the retake exam will be a 5.

BIBLIOGRAPHY

Basic:

- Udías Vallina, Agustín ; Mézcua Rodríguez, Julio. Fundamentos de geofísica. 2a ed. Madrid: Alianza, 1997. ISBN 8420681679.
- Fowler, C. M. R. The Solid earth: an introduction to global geophysics. 2nd ed. Cambridge: Cambridge University Press, 2005. ISBN 0521893070.

- Lowrie, William. Fundamentals of geophysics. 2nd ed. Cambridge: Cambridge University Press, 2007. ISBN 9780521675963.

Complementary:

- Lay, Thorne. Modern global seismology. New York: Academic Press, 1995. ISBN 012732870X.