

Course guide

310615 - 310615 - Geophysics

Last modified: 14/11/2023

Unit in charge: Barcelona School of Building Construction
Teaching unit: 748 - FIS - Department of Physics.

Degree: BACHELOR'S DEGREE IN GEOINFORMATION AND GEOMATICS ENGINEERING (Syllabus 2016).
(Compulsory subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Spanish

LECTURER

Coordinating lecturer: Carlota E. Auguet Sangrà

Others:

PRIOR SKILLS

Electromagnetism foundations.
Action of a magnetic field over a charge in movement and an element of electricity.
Magnetic 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 learning in-person classes will be alterned between clases of explanation type with classes of resolution of exercises and problems. In the expositive clases, big 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 clases of exercise and problema resolution will be done in the médium group, and alternthe resolution of practical exercises and problems by the students and clarification of the most problematic points by the professor. The professor also propose 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 with the physic-mathematic toools necessary for the study of the typical contents of Sismology and Geomagnetism.

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

STUDY LOAD

Type	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 seisms. 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

Put in common of projects and practices.

Description:

Presentation of the projects abouts different complementary topics of interests for everyone. Explanation of how was made the practice and the results obtained.

Full-or-part-time: 3h

Theory classes: 3h

Carrying out tests of continuos evaluation.

Description:

Carrying out tests of continuos 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 at the retake exam is mandatory to have attended at the final exam, and that the final mark of the subject is between 3.5 and 4.9.

The máximo qualification for the retake exam will be 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.