310615 - Geophysics

Coordinating unit: 310 - EPSEB - Barcelona School of Building Construction
Teaching unit: 748 - FIS - Department of Physics
Academic year: 2019
Degree: BACHELOR'S DEGREE IN GEOPHYSICS ENGINEERING (Syllabus 2016).
(Secondary unit Compulsory)
ECTS credits: 4,5
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: CARLOTA E. AUGUET SANGRÀ
Others: Blas Echebarria Domínguez

Prior skills
Electromagnetism foundations.
Action of a magnetic field over a charge in movement and an element of electricity.
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 learning in-person classes will be alterned between classes of explanation type with classes of resolution of exercises and problems. In the expositive classes, 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 classes of exercise and problems resolution will be done in the médium group, and alternt the 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 tools 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

<table>
<thead>
<tr>
<th>Total learning time: 112h 30m</th>
<th>Hours large group:</th>
<th>18h</th>
<th>16.00%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>27h</td>
<td>24.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>0h</td>
<td>0.00%</td>
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<td></td>
<td>Self study:</td>
<td>67h 30m</td>
<td>60.00%</td>
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### Content

<table>
<thead>
<tr>
<th>Unit</th>
<th>Description</th>
<th>Learning time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit 1</strong></td>
<td>Introduction to Geophysics and types of geophysical prospection.</td>
<td><strong>1h</strong></td>
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<tr>
<td></td>
<td>Theory classes: 1h</td>
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<tr>
<td><strong>Unit 2</strong></td>
<td>Geomagnetism. Earth magnetic field: inner and outer contributions. Dipolar field. Magnetic elements and force lines.</td>
<td><strong>6h</strong></td>
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<td></td>
<td>Theory classes: 3h, Practical classes: 3h</td>
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<tr>
<td><strong>Unit 3</strong></td>
<td>Magnetic anomalies.</td>
<td><strong>4h</strong></td>
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<td></td>
<td>Theory classes: 2h, Practical classes: 2h</td>
<td></td>
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<tr>
<td><strong>Unit 4</strong></td>
<td>Elasticity. Elastic parameters. Elastic waves and dispersive waves. Speed of transversal and longitudinal waves.</td>
<td><strong>3h</strong></td>
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<td></td>
<td>Theory classes: 1h, Practical classes: 2h</td>
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<tr>
<td><strong>Unit 5</strong></td>
<td>Geotherms. Calculus of geotherms.</td>
<td><strong>3h 30m</strong></td>
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<tr>
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<td>Theory classes: 1h 30m, Practical classes: 2h</td>
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## Unit 6

**Description:**
Structure of the Earth. Seismic waves. Sismograms and accelerograms.

**Learning time:** 5h
- Theory classes: 3h
- Practical classes: 2h

## Unit 7

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

**Learning time:** 4h
- Theory classes: 2h
- Practical classes: 2h

## Unit 8

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

**Learning time:** 3h
- Theory classes: 1h 30m
- Practical classes: 1h 30m

## Unit 9

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

**Learning time:** 1h 30m
- Theory classes: 1h
- Practical classes: 0h 30m

## Unit 10

**Description:**

**Learning time:** 4h
- Theory classes: 2h
- Practical classes: 2h
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Unit 11

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 5h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 3h</td>
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<tr>
<td></td>
<td>Practical classes: 2h</td>
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</table>

Put in common of projects and practices.

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 3h</th>
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<tr>
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<td>Theory classes: 3h</td>
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Carrying out tests of continuous evaluation.

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<tr>
<th>Description:</th>
<th>Learning time: 2h</th>
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<tr>
<td></td>
<td>Theory classes: 2h</td>
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Qualification system

It will be made two exams of continuous evaluation that will count a 25% each one. The first will be done during the seventh week of the semester, and the second one during the fourteenth week. It will also be done a final exam that will count a 5%. The final mark will be the bigger one between the average and the one of the final exam. It will be done a retake exam.

Regulations for carrying out activities

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 maximum qualification for the retake exam will be 5.
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Bibliography

Basic:

Complementary: