Course guides
2500003 - GECGEOGAPL - Applied Geology

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.
Degree: BACHELOR'S DEGREE IN CIVIL ENGINEERING (Syllabus 2020). (Compulsory subject).
Academic year: 2021  ECTS Credits: 6.0  Languages: Catalan

LECTURER
Coordinating lecturer: JOSEP MARIA SALVANY DURAN
Others: JOSEP MARIA SALVANY DURAN, DANIEL TARRAGÓ MUNTÉ

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES
Specific:
14396. Basic knowledge of geology and morphology of the land and its application in problems related to engineering. Climatology.
(Basic training module)

TEACHING METHODOLOGY
The course consists of 2 hours per week of classroom activity (large size group) and 1.6 hours weekly with half the students (medium size group).

The 2 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 1.6 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

LEARNING OBJECTIVES OF THE SUBJECT
Basic knowledge of geology, terrain morphology and climatology. Basic identification of rocks and their mechanical or hydraulic properties. Ability to identify the soil structure. Ability to interpret geological maps and make geological cross-sections from cartographic information and reconnaissance surveys.

1 Ability to identify a rock, as well as infer some basic mechanical or hydraulic properties.
2 Ability to identify the structure of the soil in the field, as well as infer some basic properties of rocks of structural, mechanical type and hydrological.
3 Ability to interpret geological maps and make geological cross-sections from cartographic information and reconnaissance surveys.

Basic knowledge of geology, terrain morphology and climatology and ability to apply it to engineering problems. Knowledge of mineralogy, and its role in the composition of rocks. Know the different types of rocks in nature: igneous rocks, sedimentary rocks and metamorphic rocks. Knowledge of structural geology, including faults and joints, as well as basic concepts of plate tectonics. Introduction to seismology. Knowledge of geomorphology and in particular the engineering implications.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>6,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>24,0</td>
<td>16.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

**Topic 1 - Structure of the Earth and plate tectonics**

Description:
Item 01 - Structure of the Earth
T2 - Plate tectonics and seismicity of the Earth

Full-or-part-time: 19h 12m
Theory classes: 8h
Self study: 11h 12m

**Topic 2 - Minerals**

Description:
T3 - Minerals

Full-or-part-time: 4h 48m
Theory classes: 2h
Self study: 2h 48m

**Topic 3 - The igneous rocks**

Description:
T4 - The igneous rocks
R1 - Practice of igneous rocks

Full-or-part-time: 4h 48m
Theory classes: 1h
Laboratory classes: 1h
Self study: 2h 48m

**Topic 4 - Surface formations (soils)**

Description:
T5 - Residual formations
T6 - Sedimentary formations

Full-or-part-time: 9h 36m
Theory classes: 4h
Self study: 5h 36m
**Item 5 - Sedimentary rocks**

**Description:**
T7 - Sedimentary rocks  
R2 - Sedimentary rocks

**Full-or-part-time:** 4h 48m  
Theory classes: 1h  
Laboratory classes: 1h  
Self study : 2h 48m

**Topic 6 - Metamorphic rocks**

**Description:**
T8 - Metamorphic rocks  
R3 - Metamorphic rocks

**Full-or-part-time:** 4h 48m  
Theory classes: 1h  
Laboratory classes: 1h  
Self study : 2h 48m

**Item 7 - Structural geology**

**Description:**
T9 - Structural geology  
M1 - The topographic map  
M2 - Monolayer maps  
M3 - Maps with monoclinals  
M4 - Maps with discrepancies  
M5 - Maps with faults  
M6 - Maps with folds  
M7 - Multistructural maps

**Full-or-part-time:** 43h 12m  
Theory classes: 4h  
Practical classes: 14h  
Self study : 25h 12m

**First partial exam**

**Full-or-part-time:** 4h 48m  
Laboratory classes: 2h  
Self study : 2h 48m
### Item 8 - Geological studies applied to civil engineering

**Description:**
- T10 - Surficial studies, geological mapping
- T11 - Studies of subsoil, trenches, soundings and geophysics

**Full-or-part-time:** 19h 12m
- Theory classes: 8h
- Self study: 11h 12m

### Item 9 - The rock massif

**Description:**
- T12 - Matrix rock
- T13 - Discontinuities

**Full-or-part-time:** 12h
- Theory classes: 5h
- Self study: 7h

### Item 10 - Geomechanical classifications

**Description:**
- T12 - Geomechanical classifications

**Full-or-part-time:** 9h 36m
- Theory classes: 4h
- Self study: 5h 36m

### Second partial examination

**Full-or-part-time:** 7h 11m
- Laboratory classes: 3h
- Self study: 4h 11m

---

**GRADING SYSTEM**

The mark of the course is obtained from the ratings of continuous assessment and their corresponding laboratories and/or classroom computers.

Continuous assessment consist in several activities, both individually and in group, of additive and training characteristics, carried out during the year (both in and out of the classroom).

The teachings of the laboratory grade is the average in such activities.

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises.

**EXAMINATION RULES.**

The partial exams will be face-to-face.
BIBLIOGRAPHY

Basic: