Course guide
250553 - FONAMGEOL - Fundamentals of Geology

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: BACHELOR'S DEGREE IN MARINE SCIENCE AND TECHNOLOGY (Syllabus 2018). (Compulsory subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: Catalan

LECTURER
Coordinating lecturer: ALBERT FOLCH SANCHO
Others: ALBERT FALQUES CASANOVAS, ALBERT FOLCH SANCHO, DANIEL TARRAGÓ MUNTÉ

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
13388. To know and apply the lexicon and concepts of the Marine Sciences and Technologies and other related fields.
13390. Establish a good practice in the integration of common numerical, laboratory and field techniques in the analysis of any problem related to the marine environment.
13401. Apply spatial and cartographic representation techniques for different environments and scales.

Generical:
13380. Develop a professional activity in the field of Marine Sciences and Technologies.
13381. Address in a comprehensive manner the analysis and preservation of the marine environment with sustainability criteria.

TEACHING METHODOLOGY

The course consists of 2 hours per week of theory classes and 2 hours weekly of practice classes.

In the theory classes, the basic concepts of the matter will be exposed by the teacher.

In the practice classes, the teacher will propose problems and exercises which will be solved by the students with the purpose to consolidate the learning objectives.

LEARNING OBJECTIVES OF THE SUBJECT

In this course, the fundamental aspects of Geology will be addressed, emphasizing on the genesis of the solid Earth (plate tectonics, range uplift, igneous activity, minerals, rock types and its origin, etc.) and the external processes that shape it (weathering, erosion, transport and sedimentation).

1.- Understand the Earth structure, the processes acting in the inner earth and on the surface and the Geological time scale and fossil record.
2.- Internalize the concepts of mineralogy, petrography, petrology.
3.- Apply the concepts of plate tectonics in seismicity volcanology, orography and continental margins. Educational formation to analyze a basic geological map.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>84.0</td>
<td>56.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6.0</td>
<td>4.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30.0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>15.0</td>
<td>10.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>15.0</td>
<td>10.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

Topic 1

Description:
Introduction to the subject

Specific objectives:
Understand the operation of the subject, because it is important for C1TM and basic concepts

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

Topic 2

Description:
Earth system, to a global vision

Specific objectives:
Interdependent vision of the subsystems of planet earth.

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

**Description:**
Earth system, to a global vision

**Specific objectives:**
Interdependent vision of the subsystems of planet earth.

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

### Topic 3

**Description:**
External geodynamics  
Learn to identify rocks

**Specific objectives:**
3.1 The external geodynamic cycle (introduction and concepts of weathering, erosion, transport and sedimentation and surface formation) (2 h)  
3.2 Sedimentary rocks (detrital, carbonate, evaporitic, organic and hydrocarbons) (2h)  
3.3 Slope processes, rivers, coasts, glaciers (2 h)  
Learn to identify rocks

**Full-or-part-time:** 21h 36m  
Theory classes: 7h  
Laboratory classes: 2h  
Self study: 12h 36m

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**Description:**
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Learn to identify rocks

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3.2 Sedimentary rocks (detrital, carbonate, evaporitic, organic and hydrocarbons) (2h)  
3.3 Slope processes, rivers, coasts, glaciers (2 h)  
Learn to identify rocks

**Full-or-part-time:** 21h 36m  
Theory classes: 7h  
Laboratory classes: 2h  
Self study: 12h 36m
Topic 4

Description:
Internal Geodynamics
Rock identification workshop

Specific objectives:
4.1 Global tectonics and seismology 4.2 Structural geology (primary and secondary structures, folds, faults and diaclasses, shear zones, fault zones) 4.3 Magmatic processes, igneous rocks and volcanism 4.4 Metamorphism and metamorphic rocks
Learn to identify rocks

Full-or-part-time: 19h 12m
Theory classes: 6h
Laboratory classes: 2h
Self study: 11h 12m

Topic 5

Description:
Morphology of the seabed

Specific objectives:
7.1 Morphotectonic units (ridges, ocean trenches, abyssal plains, etc.) 7.2 From sea to mountain: Morphology of continental margins (transition from ocean basins to the continent). The biggest drop on the planet

Full-or-part-time: 4h 48m
Theory classes: 2h
Self study: 2h 48m
Topic 5

Description:
Morphology of the seabed

Specific objectives:
7.1 Morphotectonic units (ridges, ocean trenches, abyssal plains, etc.)
7.2 From sea to mountain: Morphology of continental margins (transition from ocean basins to the continent). The biggest drop on the planet

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

Topic 6

Description:
Geological time

Specific objectives:
6.1 Introduction: the age of the earth
6.2 Relative dating of rocks and structures
6.3 Reconstruction of geological history
6.4 The scale of geological time
6.5 The Anthropocene, a time of challenges and planetary changes

Full-or-part-time: 2h 24m
Theory classes: 1h
Self study: 1h 24m
**Topic 7**

**Description:**
The tsunamis

**Specific objectives:**
8.1 The Fukushima tsunami (eg) 8.2 When and where (spatial distribution and chronology) 8.3 Causes of tsunamis: 8.3.1 Subduction and major earthquakes. 8.3.2 The end of Atlantis. collapse of volcanic boilers. Santorini (former boiler collapse) 8.4 Tsunami warning system (monitor the Canary Islands)

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

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**Topic 7**

**Description:**
The tsunamis

**Specific objectives:**
8.1 The Fukushima tsunami (eg) 8.2 When and where (spatial distribution and chronology) 8.3 Causes of tsunamis: 8.3.1 Subduction and major earthquakes. 8.3.2 The end of Atlantis. collapse of volcanic boilers. Santorini (former boiler collapse) 8.4 Tsunami warning system (monitor the Canary Islands)

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

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**Topic 8**

**Description:**
Marine Geological Prospecting
Case study of the application of geological prospecting tools

**Specific objectives:**
Geological prospecting techniques at sea
See a real and applied case of the elements explained in theory class

**Full-or-part-time:** 9h 36m
Theory classes: 2h
Practical classes: 2h
Self study : 5h 36m
### Topic 8

**Description:**
Marine Geological Prospecting  
Case study of the application of geological prospecting tools

**Specific objectives:**
Geological prospecting techniques at sea  
See a real and applied case of the elements explained in theory class

**Full-or-part-time:** 9h 36m  
Theory classes: 2h  
Practical classes: 2h  
Self study: 5h 36m

### Topic 9

**Description:**
Hydrogeology

**Specific objectives:**
8.1 What is an aquifer and groundwater  
8.2 Groundwater flow. Aquifers as storage and transfer of water  
8.3 Aquifers in coastal areas  
8.4 Seawater intrusion and submarine groundwater discharge

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

### Topic 10

**Description:**
Interdisciplinary view understanding the processes that take place in coastal areas and the different interactions occurring between land and the sea as exchange of water flux, heat and nutrients, erosion, etc.

**Specific objectives:**
Understanding the complexity of the different geological and geodynamic processes that take place in coastal areas by understanding the different concepts presented during the course.

**Full-or-part-time:** 4h 48m  
Theory classes: 2h  
Self study: 2h 48m
Topic 10

Description:
Interdisciplinary view understanding the processes that take place in coastal areas and the different interactions occurring between land and the sea as exchange of water flux, heat and nutrients, erosion, etc.

Specific objectives:
Understanding the complexity of the different geological and geodynamic processes that take place in coastal areas by understanding the different concepts presented during the course.

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

Practices and maps

Description:
Topographic maps, orthophotomaps and Google Earth
Geological maps and profiles

Specific objectives:
Learn to use these tools and appreciate their potential
Learn to interpret geological maps and draw up geological profiles

Full-or-part-time: 24h
Practical classes: 10h
Self study: 14h
Workshops and seminars

Description:
Seminars
Workshops for resolving doubts and defending practical work

Specific objectives:
Assessment of cases and real applications of the acquired knowledge as well as of different subjects related with the asignatura and the degree
Workshops dedicated to solving doubts (theory + practices + works) as well as the presentation of the practical works in front of the rest of the students

Full-or-part-time: 24h
Practical classes: 6h
Laboratory classes: 4h
Self study : 14h

Partial exams

Full-or-part-time: 14h 23m
Laboratory classes: 6h
Self study : 8h 23m

Partial exams

Full-or-part-time: 14h 23m
Laboratory classes: 6h
Self study : 8h 23m

GRADING SYSTEM

The qualification consists of the following components (the percentages indicate the weight in the grade of the subject): 1) Continuous evaluation in the classroom (30%): attendance, attitude and evaluation to the theoretical classes, workshops, geological map practices and seminars. 2) Partial exams (70%) grouped into two partial exams: a) a partial exam consisting of a theory exam (50%) and a practical examination of geological maps (20%).
EXAMINATION RULES.

The student will receive the qualification of "not presented" in the subject to the following cases: 1) unjustified absence to two practices, activities evaluable in class or deliverable within the designated dates, 2) absence of any examination.

Admission criteria for re-evaluation: Students suspended for regular assessment that have been submitted regularly to all the subject’s evaluation tests will have the option to perform a re-evaluation test during the period set in the academic calendar. These tests must be authorized by the corresponding Head of Studies, at the request of the professor responsible for the subject, and will be re-enlightened within the corresponding teaching period. Students who have already passed the student’s re-evaluation test will not be able to submit to the re-evaluation test of students who have already passed or qualified students as not present. The maximum grade in the case of presenting to the re-evaluation exam will be five (5.0). The non-attendance of a student summoned to the test of re-evaluation, celebrated in the fixed period will not be able to give rise to the accomplishment of another test with later date. Extraordinary assessments will be made for students who have not been able to carry out any of the continuous assessment tests because of their proven force majeure.

BIBLIOGRAPHY

Basic:

Complementary: