Course guides  
**250556 - QUIMEDMARI - Marine Environment Chemistry**

- **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:** 2020  
- **ECTS Credits:** 6.0  
- **Languages:** Catalan, Spanish

## LECTURER
- **Coordinating lecturer:** PATRICIA ROVIRA BASTUS  
- **Others:** PATRICIA ROVIRA BASTUS

## 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.  
13395. To set, evaluate and propose solutions to the different conflicts of use and exploitation in the marine and coastal environment resources based on scientific and technical criteria.  

**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 subject consists of 4.0 hours per week of classroom lessons in the classroom (large group). Of these, and as an average throughout the course, they dedicate 1 hour to the resolution of problems with a greater interaction with the student. Practical exercises are carried out in order to consolidate the general and specific learning objectives. Support material is used in the format of a detailed teaching plan through the ATENEA virtual campus: contents, programming of assessment activities and directed learning and bibliography.

## LEARNING OBJECTIVES OF THE SUBJECT

This course focuses on the study of the composition of seawater and the relationship between the oceans and the atmosphere. These topics will be developed through the study of the origin, distribution and evolution of the salinity of ocean waters, the chemistry of gas-liquid interactions, and the description of organic compounds (both natural and anthropogenic) and their role in a variety of oceanic processes.  

3.- Organic reactivity. Carbon compounds in the marine environment: structure and reactivity.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<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>
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<tr>
<td>Self study</td>
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<td>56.00</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

**Chemical composition of seawater**

**Description:**
Components of seawater: major and minor elements
Salinity, temperature and density of sea water
Solubility of gases and processes of ocean-atmosphere exchange
Exercises

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

**Fundamentals of Organic Chemistry**

**Description:**
Structure and classification of organic compounds
Acidity of organic compounds. Resonance
Isomerism and stereochemistry
Introduction to the reactivity of organic compounds: types of reactions and mechanisms
Exercises

**Full-or-part-time:** 26h 24m
Theory classes: 8h
Practical classes: 3h
Self study: 15h 24m

**Evaluation**

**Full-or-part-time:** 28h 47m
Laboratory classes: 12h
Self study: 16h 47m
Hydrocarbons and derivatives

Description:
Saturated hydrocarbons: alkanes and cycloalkanes. Conformational analysis.
Unsaturated hydrocarbons: alkenes and alkynes
Aromatic hydrocarbons
Exercises

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

Properties and reactivity of functional groups

Description:
Alkyl halides: nucleophilic substitution and elimination
Ethers, alcohols and phenols
Exercises
Carbonyl compounds: ketones, aldehydes, carboxylic acids and derivatives
Amines and nitrogen compounds
Exercises

Full-or-part-time: 28h 47m
Theory classes: 8h
Practical classes: 4h
Self study : 16h 47m

Introduction to structural determination

Description:
Nuclear Magnetic Resonance Spectroscopy: 1H NMR
Nuclear Magnetic Resonance Spectroscopy: 13C NMR
Mass spectrometry
Exercises
Exercises

Full-or-part-time: 21h 36m
Theory classes: 6h
Practical classes: 3h
Self study : 12h 36m

GRADING SYSTEM

The qualification of the subject is obtained from the qualifications of continuous evaluation of partial or final tests, exercises and directed activities. The teacher will provide the assessment criteria during the first week of the course.

EXAMINATION RULES.

Failure to perform a laboratory or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.
BIBLIOGRAPHY

Basic: