Course guides
2500206 - GECQUIMIC2 - Chemistry II

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.
Degree: (ANG) GRAU EN ENGINYERIA AMBIENTAL (Syllabus 2020). (Compulsory subject).
Academic year: 2020 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: LUCIA FERNANDEZ CARRASCO
Others: LUCIA FERNANDEZ CARRASCO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
14446. Solve mathematical problems that may arise in engineering by applying knowledge about: linear algebra, geometry, differential geometry, differential and integral calculus, optimization, ordinary differential equations.
14447. Obtain basic knowledge about the use and programming of computers, operating systems, databases and basic numerical calculation and applied to engineering.
14448. Manage the basic concepts about the general laws of mechanics and thermodynamics, concept of field and heat transfer, and apply them to solve engineering problems.
14449. Apply the basic principles of general chemistry, organic and inorganic chemistry and their applications in engineering.
14450. Describe the global functioning of the planet: atmosphere, hydrosphere, lithosphere, biosphere, anthroposphere, biogeochemical cycles (C, N, P, S), soil morphology and apply it to problems related to geology, geotechnics, edaphology and climatology.

Generical:
14440. Identify, formulate and solve problems related to environmental engineering.
14441. Apply the functions of consulting, analysis, design, calculation, project, construction, maintenance, conservation and exploitation of any action in the territory in the field of environmental engineering.
14444. Apply business management techniques and labor legislation.

TEACHING METHODOLOGY

The course consists of 2 hours per week of classroom activity (large size group) and 1 hour 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 hour 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.

To do the laboratory practices you need the following personal protective equipment (PPE):
* Chemical Kit (white lab coat + protection gloves + safety glasses)
LEARNING OBJECTIVES OF THE SUBJECT


1. Understand the chemistry of gas-liquid interactions
2. Describe organic compounds of both natural and anthropogenic origin and their role in environmental processes.

Chemistry II. Establishing the foundations of the chemistry of gas-liquid interactions and the description of organic compounds (of natural and anthropogenic origin) and their role in a variety of environmental processes.

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 small group</td>
<td>15,0</td>
<td>10.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>15,0</td>
<td>10.00</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
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Total learning time: 150 h
CONTENTS

General aspects of organic chemistry. Chemical nomenclature.

Description:
The organic composts naturals and synthetics are currently so numerous that after the first few initials designates pels first chemical organic, it is established by the International Union of Pure and Applied Chemistry (IUPAC)
In this subject, the aliens and some of the owners of the non-saturated compost are studied.
The non-saturated organic composts can have cyclic or anell structures.
Organic compounds that have the same chemical formula but different structures and therefore differentiated properties will be analyzed.
Linear organic compounds can be presented with double or triple bonds
Compounds with unsaturated cyclic structures in carbon-carbon bonds of the rings and their characteristics will be studied.
Classification and analysis of organic compounds present in nature and from products of productive organic synthesis. Action on the media.
Description of organic pollutants in the environment: air, soil, aquifers: effects on the environment
Description of alcohols and phenols.
Analysis of the characteristics of aldehydes and ketones, methods of obtaining and applications.
Obtaining and applications, description of properties.
In this topic, the characteristic reactions of some of the most interesting organic compounds will be described from the environmental point of view and in the mechanisms that describe how these reactions take place.

Specific objectives:
Learn and understand the structure of organic compounds and their properties. As is its process of obtaining and applications.
Analyze the nomenclatures for chiral organic compounds and for alkene isomers.
to know the natural and artificial organic compounds and their possible effect on the natural environment. Analysis of organic pollutants.
Interaction of organic pollutants and the environment.
Discussion of the structure, function and synthesis of organic compounds containing the main functional groups.
Differentiate between substitution, addition and elimination reactions Differentiation between different organic reaction mechanisms

Full-or-part-time: 72h
Theory classes: 30h
Self study : 42h

Exercise resolution

Description:
Proposal sessions and guided problem solving

Full-or-part-time: 36h
Practical classes: 15h
Self study : 21h

Laboratory sessions

Description:
Classroom laboratory classes

Specific objectives:
To know how the organic compounds are determined or characterized experimentally by means of different analysis techniques.

Full-or-part-time: 36h
Laboratory classes: 15h
Self study : 21h
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.

BIBLIOGRAPHY

Basic: