

## SUBJECT TEACHING GUIDE

### G1995 - Chemistry and its application in Natural Systems

Double Degree in Physics and Mathematics

Double Degree in Physics and Mathematics

Degree in Physics

Academic year 2023-2024

Degree in Physics

1. IDENTIFYING DATA					
Degree	Double Degree in Physics and Mathematics Double Degree in Physics and Mathematics			Type and Year	Core. Year 1 Core. Year 1
Faculty	Faculty of Sciences				
Discipline	Chemical Matter and Its application in Natural Systems Basic Module				
Course unit title and code	G1995 - Chemistry and its application in Natural Systems				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS DE LA TIERRA Y FISICA DE LA MATERIA CONDENSADA				
Name of lecturer	JUAN REMONDO TEJERINA				
E-mail	juan.remondo@unican.es				
Office	Facultad de Ciencias. Planta: + 2. DESPACHO PROFESORES (2018)				
Other lecturers	XABIER EDUARDO MORENO-VENTAS BRAVO CESAR MORENO SIERRA LORENA GONZALEZ LEGARRETA MIGUEL GARCIA IGLESIAS				

### 3.1 LEARNING OUTCOMES

- To understand how to focus simple experiments involving basic phenomena in different disciplines of the natural sciences .  
To become familiar with the interconnections between these natural phenomena .
- To understand the need for an integrated analysis , approached from complementary perspectives, to study a natural system, identifying the essential parameters. In particular:
  - \* the chemical point of view: most relevant organic and inorganic chemical components and their properties, possible reactions and monitoring.
  - \* the geological point of view: composition of the geological environment and dynamic of geological processes.
  - \* the biological point of view: biological communities and impact of the processes in their distribution and evolution.
- To become familiar with basic instrumentation to collect essential data on natural systems and to understand the physico-chemical basis of that instrumentation.
- To understand the basis of simple mathematical models applied to analyze natural systems . To know how to make graphs of evolution and to validate them experimentally.

### 4. OBJECTIVES

- To make the student understand the unity of Nature and the interrelationships between the different processes and natural phenomena. To establish the connecting points between the different disciplines within Earth Sciences and the need to study natural phenomena from a multidisciplinary perspective.
- To know the most relevant organic and inorganic chemical components and their properties , as well as the possible chemical reactions.
- To become familiar with chemistry and to understand its importance and the applications for the study of natural systems .
- To understand examples of chemistry applied to the study of natural systems .
- To understand the planning of simple scientific experiments in order to analyze phenomena , based on different Natural Science disciplines (Physics, Chemistry, Biology and Geology).

### 6. COURSE ORGANIZATION

CONTENTS	
1	Unit 1.- Introduction to the chemistry of natural systems. Unit 2.- Basic concepts of chemistry, chemical solutions. Structure of matter. Chemical bond. Exercises and problem solving. Laboratory practical work.
2	Unit 3.- Chemical equilibrium. Acid-base reactions. Precipitation reactions. Exercises and problem solving. Laboratory practical work.
3	Unit 4.- Geochemistry, analysis of Earth's materials; practical cases of chemistry applied to geology.
4	Unit 5.- Case studies of chemistry applied to biology.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Laboratory practical work. 3 reports on the laboratory work will be delivered electronically throughout the semester.	Laboratory evaluation	No	Yes	40,00
Technical/practical written exam.	Written exam	Yes	Yes	60,00
TOTAL				100,00
Observations				
In the laboratories, the use of lab coats and safety glasses that the students must acquire will be compulsory. Without this material, entry into the laboratory will not be allowed (UC Laboratory Work Regulations).				
Observations for part-time students				
For part-time students it is also mandatory to attend laboratory practices, as well as delivery of the corresponding reports.				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
<ul style="list-style-type: none"> <li>- R. Chang (2010). Química. 10ª ed. Mc Graw Hill.</li> <li>- Th. L. Brown, H.E. LeMay (Jr), B.E. Bursten, J.R. Burdge (2004). 9ª ed. Química. La ciencia central. Ed. Pearson-Prentice Hall.</li> <li>- Bibliografía suministrada por el profesorado de la asignatura.</li> </ul>