

## SUBJECT TEACHING GUIDE

G1957 - Physical-Chemical Fundamentals of Materials

Degree in Civil Engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Degree in Civil Engineering			Type and Year	Compulsory. Year 1
Faculty	School of civil Engineering				
Discipline	CONSTRUCTION MATERIALS				
Course unit title and code	G1957 - Physical-Chemical Fundamentals of Materials				
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. CIENCIA E INGENIERIA DEL TERRENO Y DE LOS MATERIALES				
Name of lecturer	JOSE ALBERTO ALVAREZ LASO				
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Other lecturers	ROBERTO LACALLE CALDERON				

### 3.1 LEARNING OUTCOMES

- Scientific-technical training for the exercise of the profession of Technical Engineer of Public Works and knowledge of the functions of advisory, analysis, design, calculation, project, construction, maintenance, conservation and exploitation. Understanding the multiple technical and legal conditions that arise in the construction of a public work, and ability to employ proven methods and accredited technologies, in order to achieve the greatest efficiency in construction in respect for the environment and the protection of the safety and health of workers and users of the public work. Capacity for the maintenance, conservation and operation of infrastructures, in its field. Knowledge of the history of civil engineering and training to analyze and evaluate public works in particular and construction in general.
- Distinguishes the chemical properties of conglomerates used for the manufacture of building materials. Apply the relevant experimental methods of chemistry in civil engineering

#### 4. OBJECTIVES

Train university graduates with rigorous technical-oriented physical-mathematical preparation and solid generalist preparation in civil engineering.

Working the scientific method is the basis of teaching and learning the technique

Advise, analyze, design, calculate, project, build, maintain, conserve and exploit infrastructures in the field of engineering within the attributions of the degree. Know the proven tools and methods used in Civil Engineering

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	Introduction to materials
2	Atomic structure
3	Atomic structure,
4	Atomic bonding forces.
5	Material states. Dissolutions
6	Chemical equilibrium. Acid-base relationship
7	Solidification, diffusion
8	Solid solutions and phase diagrams
9	Mechanical properties
10	Metallic materials
11	oxidation and corrosion
12	ceramics, glasses, polymers and compounds
13	Conglomerates and concretes

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
mid term exam (35%)	Written exam	Yes	Yes	35,00
End term exam (35%)	Written exam	Yes	Yes	35,00
continuous assessment (20%)	Written exam	No	No	20,00
Lab (10%)	Work	No	No	10,00
TOTAL				100,00

### Observations

A remote assessment scenario is envisaged if the authorities indicate this .

With regard to the agreements adopted at the regular session of the School Board held on 10 June 2010, it is established that, with respect to evaluation activities that are recoverable,

- As a general criterion and unless a different thing is specified in this guide , a student may only show up for recovery of activities that he has not passed, that is, in which he has not obtained a minimum grade of five out of ten.

- As a general criterion and unless a different thing is specified in this guide , in the recovery period the procedure for evaluating an activity will be the same as that of the originating activity.

Note: According to Royal Decree RD 1125/2003 on the European credit system and the system of qualifications in university qualifications of an official nature and validity throughout the national territory , the results obtained by the student in each of the subjects of the curriculum will be classified according to the following numerical scale from 0 to 10, with the expression of a decimal, to which the corresponding qualitative qualification can be added:

0.0-4.9: Suspense (SS).

5.0-6.9: Approved (AP).

7.0-8.9: Notable (NT).

9.0-10: Outstanding (SB).

To pass the subject it will be necessary, in addition to reaching a 5.0 final grade, to have a minimum of 4.0 in each of the two exams (partial and final) performed throughout the quarter. Notes less than 4.0 will not be compensable.

In the event that one of the two parts in which the subject is divided has a grade greater than 4.0, it may be saved for the extraordinary evaluation exam.

### Observations for part-time students

In the case of students on part-time dedication regimes, the student may undergo a single evaluation process.

In this case, the student must attend and pass the laboratory practices.

The single assessment shall consist of a partial examination, a final examination and an evaluation test, the date of which shall be set at the beginning of the course.

Likewise, the student will be entitled to obtain the same grade as students undergoing continuous evaluation processes.

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

Chang, R. ; Fundamentos de química; McGraw Hill

Callister W. D. Ciencia e Ingeniería de materiales Wiley (6 Ed.)

Caselles Pomares, Mj ; Sardá Hoyo, J ; Molero Meneses, M ; Gómez Antón, Mr QUÍMICA APLICADA A LA INGENIERÍA (2ª) ; U N E D

Petrucci, R.H y Haewood, W.S Química General. Principios y Aplicaciones. Ed. Prentice Hall (2003)

Michael Ashby, Hugh Shercliff and David Cebon, Materials, Engineering, Science, Processing and Design; HB ed.

Taylor, Telford Publ. Cement Chemistry , (2003)

Barret, Nix, Tetelman, The principles of engineering materials Prentice Hill

Bengoa y otros, Materiales de Construcción, Universidad de Cantabria

