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|---|---|
| Centre | **University College of Engineering of Vitoria-Gasteiz** |
| Name of subject | **25975 – Chemical Foundations of Engineering** |
| Qualification | **Degree in Industrial Chemical Engineering** |
| Brief description of the subject content | **General chemistry. Inorganic chemistry. Organic chemistry.** |
| Type | **Compulsory** |
| Credits | **9 ECTS** |
| Year | **1** |
| Term(s) | **1st and 2nd** |
| Department | **Chemical and Environmental Engineering** |
| Language | **Spanish and Basque** |

## Outcomes / Objectives

- General chemistry.
- Inorganic chemistry.
- Organic chemistry.

## Syllabus

1. Atomic structure. Basic concepts. Current atomic model. Electronic structures. Periodic classification.
2. Formation of molecules. Chemical bonding models. Covalent bond. Structure of molecules. Theories of covalent bonding.
3. Crystal structures. Formation of three-dimensional structures. Ionic bond. Properties of ionic compounds. Metallic bonding. Properties of metallic solids.
4. States of aggregation. Behaviour of gas systems. Liquid state. Properties. Phase equilibrium.
5. Dispersed systems. Solutions. Dispersed systems. Solutions of volatile solutes. Raoult's Law. Solutions of solid solutes. Colligative properties
6. Systematic study of reactions in inorganic chemistry. Acid-base reactions. Redox reactions. Electrochemical processes.
7. Behaviour of elements. Systematic study of main group elements. Elements: origin, properties
8. Structural classification of organic compounds. Functional groups in organic chemistry and properties of compounds
9. Isomerism and Stereoisomerism. Structural isomerism. Conformational analysis. Configurational isomerism
10. Chemical reactions of organic compounds. Reactivity and reaction mechanisms. Obtaining products of industrial interest

## Methodology

### Teaching Method

**Face-to-Face Teaching Hours**

| Lectures | Seminars | Classroom practice | Lab. practice | Computer sessions | Clinical practice | Workshops | Industrial workshops | Field practice |
|---|---|---|---|---|---|---|---|---|
| 45.0 | 0.0 | 30.0 | 15.0 | | | | | |

**Student Hours of Non Face-To-Face Activities**

| Lectures | Seminars | Classroom practice | Lab. practice | Computer sessions | Clinical practice | Workshops | Industrial workshops | Field practice |
|---|---|---|---|---|---|---|---|---|

| Student Hours of Non Face-To-Face Activities | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Lectures** | **Seminars** | **Classroom practice** | **Lab. practice** | **Computer sessions** | **Clinical practice** | **Workshops** | **Industrial workshops** | **Field practice** |
| **67.5** | **0.0** | **45.0** | 33.5 | | | | | |

## Assessment System

### General criteria

- Written essay exam
- Practical activities (exercises, cases or problems)
- Individual projects.
- Team projects.

### Clarification regarding assessment

- Exams 70%
- Portfolio 10%
- Deliverables (problems, projects, etc.) 15%
- Bibliographic Assignment 5%

# Bibliography

### Basic Bibliography


- ATKINS-JONES. Principios de química. Los caminos del descubrimiento Editorial Panamericana
- BROWN, T.D. y LEMAY Jr., H.G. Química. La Ciencia Central. Editorial: Prentice Hall Hispanoamericana
- CHANG, R. Química. Editorial: McGraw Hill
- REBOIRAS, M.D. Química: la ciencia básica Editorial Thomsom
- PRIMO YÚFERA E. Química Orgánica básica y aplicada. Ed. Reverté
- QUINOÁ E. Y R. RIGUERA. Cuestiones y ejercicios de Química Orgánica. Ed. McGraw-Hill


### In-depth Bibliography


- CASABÓ, J. Estructura atómica y enlace químico. Editorial Reverté.
- RODGERS, G. Química inorgánica. Editorial: McGraw Hill
- VOLLHARDT P. Química Orgánica. Ed. Omega


### Websites

- http://cwx.prenhall.com/bookbind/pubbooks/blb_la/
- http://highered.mcgraw-hill.com/sites/970106111x/