

Centre	University College of Engineering of Vitoria-Gasteiz
Name of subject	25975 – Chemical Foundations of Engineering
Qualification	Degree in Mechanical 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/>