

Academic Year: ( 2022 / 2023 )

Review date: 19-04-2022

Department assigned to the subject: Materials Science and Engineering and Chemical Engineering Department

Coordinating teacher: GONZALEZ BENITO, FRANCISCO JAVIER

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 2

Branch of knowledge: Engineering and Architecture

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Chemistry (High school)

**OBJECTIVES**

TBy the end of this content area, students will be able to have:

1. Knowledge and understanding of the chemical basis, organic and inorganic applied chemistry underlying the branch of industrial engineering;
2. The ability to apply their knowledge and understanding to identify, formulate and solve problems of chemical basis, organic and inorganic applied chemistry using established methods;
3. The ability to design and conduct appropriate experiments of chemistry, interpret the data and draw conclusions;
4. Workshop and laboratory skills in chemistry.
5. The ability to select and use appropriate equipment, tools and methods to solve problems of chemical basis, organic and inorganic applied chemistry;
6. The ability to combine theory and practice to solve of chemical basis, organic and inorganic applied chemistry.
7. The ability to function effectively both individually and as a team.

**DESCRIPTION OF CONTENTS: PROGRAMME**

- Topic 0. Introduction to Chemistry, Preliminary concepts
- Topic 1. The Atomic Structure. Periodic Properties
- Topic 2. Chemical Bonding
- Topic 3. States of Matter (I): Gases, Liquids and Solids
- Topic 4. States of Matter (II): Solutions: Colligative properties
- Topic 5. Thermochemistry
- Topic 6. Chemical equilibrium
- Topic 7. Acid-base and solubility equilibria
- Topic 8. Red-Ox equilibrium and Electrochemistry
- Topic 9. Chemical kinetics
- Topic 10. Introduction to Chemical Engineering
- Topic 11. Introduction to Organic Chemistry. Organic Functions and reactivity

**LEARNING ACTIVITIES AND METHODOLOGY**

Master classes, tutorial classes in small groups dedicated to resolving student questions and doubts, student presentations, individual tutorials, and individual work by the students; activities dedicated to acquisition of theoretical knowledge related to the lecture course (3 ECTS credits)

Laboratory practical sessions and classes in small groups dedicated to solving question sheets, individual tutorials and individual work by the student; activities dedicated to acquisition of practical skills related to the lecture course (3 ECTS credits)

- Before accessing the laboratories, all students should watch some videos on safety in chemistry laboratories and, after that, they have to pass some virtual questionnaires (Aula Global) in order to demonstrate the contents of the videos are understood.

**ASSESSMENT SYSTEM**

Continuous evaluation (minimum 45 %):

- Continuous evaluation will be based on class attendance and assessed tests performed in class (minimum 35%).

- Attendance to practical sessions of laboratory and laboratory reports assessment (10%).  
Final exam (55%).  
Laboratory practices are mandatory for being assessed.

<b>% end-of-term-examination:</b>	55
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	45

#### BASIC BIBLIOGRAPHY

- A. VIAN ORTUÑO Introducción a la Química Industrial, Reverté..
- G. CALLEJA, F. GARCIA, A. DE LUCAS, D. PRATS, J.M. RODRIGUEZ Introducción a la Ingeniería Química, Síntesis..
- J. COSTA, S. CERVERA, F. CUNILL, S. ESPLUGAS, C. TEIXIDO, J. MATA Curso de Ingeniería Química, Reverté..
- K. HEINZ BÜCHNER, HANS-HEINRICH MORETTO, P. WODITSCH, Industrial Inorganic Chemistry, Wiley-VCH; 2000..
- K. WEISSERMEL, HANS-JÜRGEN ARPE, Industrial Organic Chemistry, 4th Edition, Wiley & Sons; 1997..
- P.W. ATKINS, L. JONES Chemical Principles, W.H. Freeman & Co, 2001
- R. CHANG. Chemistry,, McGraw-Hill Science, 2006..
- R.T. MORRISON, R.N. BOYRD Química Orgánica, Addison-Wesley Iberoamericana..