Chemical fundaments of engineering

Academic Year: (2019 / 2020) **Review date: 28/04/2020 15:39:46**

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

Atoms, Molecules and Ions. Chemical bonding.
Thermochemistry and chemical equilibrium.
Chemical Equilibrium: Acid-Base and solubility equilibriums. Electrochemistry.
Chemical Kinetics
Applied Organic and Inorganic Chemistry
Basic operations in Chemical Engineering

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 contains of the videos are understood.

ASSESSMENT SYSTEM

% end-of-term-examination/test:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

- Continuous evaluation (minimum 40 %):
Continuous evaluation will be based on class attendance and assessed tests performed in class (minimum 30%) and attendance to practical sessions and assessed practical work paper (10%),
Final exam (60%).
Laboratory practices are mandatory for being assessed.

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 Químic, 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..