

## 30004 - Chemistry

### Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS	6.0
Course	1
Period	Half-yearly
Subject Type	Basic Education
Module	---

### 1.Basic info

#### 1.1.Recommendations to take this course

#### 1.2.Activities and key dates for the course

### 2.Initiation

#### 2.1.Learning outcomes that define the subject

#### 2.2.Introduction

#### Brief presentation of the subject

This subject belongs to the basic training module of the industrial branch of engineering degrees.

In the subject "Chemistry", the student's acquired knowledge during the secondary education is homogenized. Besides, new basic concepts which will serve as starting point for subsequent subjects are introduced. The key points of this subject consist of fundamentals of Chemistry applied to Engineering: composition and properties of matter, as well thermodynamic and kinetic aspects of chemical reactions.

### 3.Context and competences

#### 3.1.Goals

#### 3.2.Context and meaning of the subject in the degree

#### 3.3.Competences

#### 3.4.Importance of learning outcomes

### 4.Evaluation

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### 5. Activities and resources

#### 5.1. General methodological presentation

The learning process designed for this subject is based on the following aspects:

The subject is designed to enhance the student's active learning. For each chapter, a general introduction will be made by means of theoretical classrooms, which will be complemented with the rest of proposed activities, including solution of questions and problems, attendance to tutorships and laboratory practices.

#### 5.2. Learning activities

The syllabus offered to help the students to achieve the expected results covers the following activities:

Theoretical sessions (35 hours) and solution of problems (15 hours): (5.0 ECTS)

Master classes will be used in most cases, and information will be transmitted orally with TIC support. During the classrooms of solution of problems, the participation of students will be promoted.

Laboratory practical sessions (1 session of 1 hour + 3 sessions of 3 hours): (1.0 ECTS)

Laboratory practical sessions are designed to help students to acquire skills in laboratory material handling and to develop their deductive, communication, team working and analytical capabilities.

The solution of preliminary questions has been designed to enhance the autonomy in learning and working.

Special efforts are devoted to the importance of security norms in laboratory as well as the correct handling of residues, key points in the engineering field.

#### 5.3. Program

Classrooms and solution of problems:

**First control:** (15 hours)

Chapter 1.- Periodic system of elements

Chapter 2.- Chemical bond and compounds

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Chapter 3.- Fundamental laws of Chemistry

Chapter 4.- Properties of gases and liquids

**Second Control:** (20 hours)

Chapter 5.- Chemical thermodynamics

Chapter 6.- Chemical kinetics

Chapter 7.- Inorganic and organic compounds

**Third control:** (15 hours)

Chapter 8.- Introduction to electrochemistry

Chapter 9.- Chemical composition of aqueous solutions

Chapter 10.- Study of chemical equilibrium

Laboratory practices:

Session 0: Introduction to chemistry laboratory (1 hour)

Session 1: Gases and preparation of solutions (3 hours)

Session 2: Reaction kinetics. Redox reactions (3 hours)

Session 3: Chemical equilibrium. Standardization of hydrochloric acid (3 hours)

### 5.4.Planning and scheduling

#### Calendar of classroom sessions and presentation of works

Master classrooms: 50 hours

Practical sessions: 10 hours

Practical session's deliverable reports: 10 hours

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Personal study and work : 74 hours

Realization of exams: 6 hours

The master classrooms, solution of problems and laboratory practical sessions are given according to the timetable established by EINA, which is published before the beginning of the academic year.

The tutorship schedules are available in the web of EINA as well as in the offices of professors responsible for the subject. Out of hours, tutorships can be arranged with the teaching staff by electronic mail.

### 5.5. Bibliography and recommended resources

- [basic] Petrucci, Ralph H. Química general / Ralph H. Petrucci, William S. Harwood, F. Geoffrey Herring; with the collaboration of Scott S. Perry; translation, Concepción Pando G<sup>a</sup>-Pumarino, Nerea Iza Cabo; technical revision, Juan A. Rodríguez Renuncio. - 8th ed., Madrid : Prentice Hall, cop. 2010
- [basic] Peterson, W. R. Nomenclatura de las sustancias químicas / W. R. Peterson. - 3<sup>a</sup> ed. Barcelona: Reverté, D. L. 2013
- [basic] López Cancio José A. Problemas de Química / José A. López Cancio; with the collaboration of Antonio Vera Castellanos. Madrid. Prentice Hall
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- [complementary] Chang, Raymond. Fundamentos de química / Raymond Chang ; adapted by Pedro Ibarra Escutia ; technical revision, Isaías de la Rosa Gómez. México D. F.: McGraw-Hill/Interamericana, cop. 2011