SUBJECT TEACHING GUIDE

G986 - Chemistry

First Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2025-2026

1. IDENTIFYING DATA					
Degree	First Degree in Industrial Electronic Engineering and Automatic Control Systems			Type and Year	Core. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Chemistry Basic Training Module				
Course unit title and code	G986 - Chemistry				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Knowledge Field	Industrial engineering, mechanical engineering, automation engineering, industrial organization engineering and navigation engineering				
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. DE QUIMICA E INGENIERIA DE PROCESOS Y RECURSOS.
Name of lecturer	LORENA GONZALEZ LEGARRETA
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Other lecturers	JOSEFA FERNANDEZ FERRERAS BERTA GALAN CORTA EVA CIFRIAN BEMPOSTA LUCIA PEREZ GANDARILLAS MARINA GONZALEZ BARRIUSO ISABEL SOLANA DE MARIA

4. OBJECTIVES
The aim of this course is to provide students with the basic knowledge of chemistry that will allow them to develop the skills they need to acquire related to chemistry for the development of their profession as engineers.

6. SUBJECT PROGRAM	
CONTENTS	
1	BASIC CONCEPTS OF INORGANIC AND ORGANIC CHEMISTRY APPLIED TO ENGINEERING Topic 1. THE ATOM, ELEMENTS AND COMPOUNDS. Nomenclature of inorganic compounds. The periodic table. Periodic properties of the elements. Types of chemical reactions. Reactions in solution. Topic 2. INTRODUCTION TO CHEMICAL BONDING. The ionic bond, lattice energy. Properties of the ionic compounds. The covalent bond, polarity. Intermolecular forces, properties of the molecular covalent compounds. The metallic bond. Conductive materials, semiconductors and insulators. Topic 3. THERMOCHEMISTRY. Energy changes in chemical reactions. Introduction to thermodynamics. Enthalpy of chemical reactions. Calorimetry. Standard enthalpy of formation and reaction. Heat of dissolution and dilution. SOLVING PROBLEMS/QUESTIONS. PRACTICES 1, 2 and 3
2	CHEMICAL BALANCE AND ELECTROCHEMISTRY Topic 4: CHEMICAL BALANCE: Concept of chemical equilibrium, relationship between the constants Kc and Kp, heterogeneous equilibria, equilibria in several stages, degree of dissociation, factors that modify chemical equilibrium. Topic 5: ACID-BASE BALANCE: Properties of acids and bases, definitions of acids and bases, relative strengths of acids and bases, self-ionisation of water, pH scale, ionisation constant of an acid and a base, relationship between ionisation constants of acid-base conjugate pairs, diprotic acids and polyprotic acids, acid-base properties of salts, buffer solutions. Topic 6: OXIDATION-REDUCTION REACTIONS: redox reactions, oxidation number, adjustment of a redox reaction. Topic 7: ELECTROCHEMICAL CELL: electrochemical cell, standard electrode potentials, work or energy of an electrochemical cell, effect of concentration on cell fem, Nernst equation, concentration cells. Topic 8: ELECTROLYTIC CELLS: electrolysis, quantitative aspects of electrolysis. SOLVING PROBLEMS/QUESTIONS. PRACTICES 4 and 5

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Assessment test 1	Written exam	No	Yes	35,00
Assessment test 2	Written exam	Yes	Yes	35,00
Laboratory practice	Laboratory evaluation	No	Yes	15,00
Work and problem solving	Work	No	No	15,00
TOTAL				100,00

Observations

In order to pass the continuous assessment, the four parts will be taken into account: the delivery of the exercises and problems collected during the classes, the laboratory practicals and the assessment tests 1 and 2. The final grades of the ordinary and extraordinary exams will be determined considering the following percentages: 15% for the delivery of exercises and/or problems, 15% for the laboratory practicals, 35% for assessment test 1 and 35% for assessment test 2.

Observations for part-time students

Single assessment for students enrolled part-time. The student may pass the course by taking assessment tests 1 and 2 and/or the extraordinary exam.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

American Chemical Society, "Química" un proyecto de la ACS. Ed. Reverté, 2007.

R. Chang, "Química". Ed. Mc Graw Hill, (9ª Ed.) 2007.

R.H. Petrucci, W.S. Harwood, F.G. Herring. "Química General". Ed. Mc Graw Hill, 2007.

J. Vale, C. Fernández, M. Piñero, M. Alcalde, R. Villegas, L. Vilches, B. Navarrete, Á García. "Problemas resueltos de Química para Ingenieros." Ed. Thomson, 2004.