UNIVERSIDADE DA CORUÑA

Teaching Guide					
Identifying Data					2015/16
Subject (*)	Química			Code	770G01004
Study programme	Grao en Enxeñaría Electrónica Industrial e Automática				
Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	1st four-month period	First		FB	6
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	Química Analítica				
Coordinador	Alonso Rodriguez, EliaGonzalez Rodriguez, Maria Victoria		E-mail	elia.alonso@udc.esvictoria.gonzalez.rodriguez@udc.es	
Lecturers	Alonso Rodriguez, Elia Gonzalez Rodriguez, Maria Victoria		E-mail	elia.alonso@udc.es victoria.gonzalez.rodriguez@udc.es	
Web					
General description	Introduction to the scientific foundations of chemistry in relation to their technological applications				

Study programme competences	
Code	Study programme competences
A8	Capacidade para comprender e aplicar os principios e coñecementos básicos da química xeral, química orgánica e inorgánica e as súas aplicacións na enxeñaría.
B1	Capacidade de resolver problemas con iniciativa, toma de decisións, creatividade e razoamento crítico.
B2	Capacidade de comunicar e transmitir coñecementos, habilidades e destrezas no campo da enxeñaría industrial.
B4	Capacidade de traballar e aprender de forma autónoma e con iniciativa.
B6	Capacidade de usar adecuadamente os recursos de información e aplicar as tecnoloxías da información e as comunicacións na enxeñaría.
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.

Learning outcomes			
Learning outcomes	Study programme competences		
Utilize the basic principles of general chemistry, organic chemistry and inorganic chemistry. Apply the basic laws governing reactions: thermodynamics, kinetics and equilibrium.	A8		
Solve exercises and analyze results.		B1	
Apply theoretical concepts in the laboratory.		B4	
List and discuss data and results		B2 B6	C3

Contents	
Topic	Sub-topic
Topic 1. Basics of Chemistry.	- Stoichiometry. Theorical and Percentage Yields. Limiting Reactant. - Atoms. The Quantum Mechanical Model. - Periodic Table of the Elements. - Chemical Bond. Main types of chemical bonds: ionic, covalent, metallic. Intermolecular Forces.

Topic 2. Thermochemistry	- Heats of Chemistry Reaction - Enthalpy - Calorimetry - Introduction to thermodynamics
Topic 3. Rates of Reaction	- Reaction Rates - Reaction Rates Equation - Dependence of Rate on Concentration - Activation energy - Catalysis - Mechanism
Topic 4. Chemical Equilibrium	- Chemical Equilibrium. The Equilibrium Constant. - Gaseous Reactions. Le Chatelier's Principle - Acid-Base Equilibria
Topic 5. Electrochemistry I	- Oxidation -Reduction Reactions. Balancing - Standard Electrode Potentials - Spontaneity from Electrode Potencials - Nernst Equation
Topic 6. Electrochemistry II	- Voltaic Cells. Batteries - Electrolysis. Stoichiometry of Electrolysis
Topic 7. Corrosion	- Concept - Corrosion process and influence factors - Methods to protect metals from corrosion - Atmospheric Corrosión - Marine Corrosion
Topic 8. Organic Chemistrya	- Introduction to Organic Chemistry - Functional Groups - Nomenclature - Isomers - Main types of organic reactions
Topic 9. Organic Chemistry Applied to Engineering	- Carbon - Oil - Gas - Biomass - Polymers
Topic 10. Introduction to Industrial Chemistry	- Engineering Process - Mass Balance
Topic 11. Inorganic Chemistry Applied to Engineering	- Metallurgy - Industrial Inorganic Compounds: Synthesis - Main Technologic Inorganic Materials: Semiconductors, Optic Fiber, Ceramic, Superconductors
Topic 12. Introduction to Instrumental Techniques for Industrial Analysis	- Classification of Instrumental Techniques - Quality Parameters in the Analytical Laboratory - Calibraction - Significant Digits

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A8	21	29.4	50.4
Problem solving	A8 B1	20	38	58

Multiple-choice questions	A8 B6 B4 C3	1	4	5
Laboratory practice	A8 B6	5	5	10
Supervised projects	B2 B4 B6 C3	3	6	9
Objective test	A8 B1	4	12	16
Personalized attention		1.6	0	1.6
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
Guest lecture / keynote speech	Participants take notes and make questions
Problem solving	Participants apply rules, write mathematical relationships and analyze results
Multiple-choice questions	Participants complete online exercises and individual self-assessment is available
Laboratory practice	Participants perform an experiment following a written procedure and write a report
Supervised projects	Participants summarize and discuss information
Objective test	Participants answer questions and problems

Personalized attention	
Methodologies	**Description**
Supervised projects	Reviewing the development of intermediate and final stages of supervised projects Resolving specific issues

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Supervised projects	B2 B4 B6 C3	Elaboration of supervised projects and presentation in the classroom. Performing an activity and objective test.	10
Objective test	A8 B1	A first test (theory and problems) will be carried out about half of the semester. The subject taught until then will be evaluated. At the end of course, a partial second test (theory and problems) will be performed for students who have passed the first test. Simultaneously a global test (theory and problems) will be performed for students who have not approved the first test. Each test consists of two independent parts, being necessary to obtain a minimum score on each part to compensate: - Theory, maximum score 4 points, minimum score 1.5 points to compensate. - Problems, maximum score 3 points, 1 point minimum to compensate score.	70
Problem solving	A8 B1	Resolution of the exercise bulletins and active involvement in the classroom activities.	10
Laboratory practice	A8 B6	Active involvement in carry out the laboratory practices and reports.	5
Multiple-choice questions	A8 B6 B4 C3	Solving self-assessment online exercises proposed before test	5

Assessment comments
A minimum of 75% of the laboratory practical classes have to be carried out by each student to be evaluated . A minimum mark of 3 points is requested in the test to take into account the other marks.

Sources of information

Basic	- http://eup.cdf.udc.es (). . - VINAGRE F., VAZQUEZ DE MIGUEL L.M. (1996). "Fundamentos y problemas de química" . Alianza, 2ª Ed. - McMurry, Fay (2009). "Química General" . Prentice Hall - CHANG (2002). "Química" . Interamericana. Mc Graw - Hill. 7ª Edición - PÉREZ IGLESIAS, J. y SECO LAGO, H.M. (2006). ?Experimentos de química. Aplicaciones a la vida cotidiana" . Badajoz. Editorial Filarias - Petrucci, Ralph H. (2011). "Química general: principios y aplicaciones modernas". Prentice Hall
Complementary	- PETERSON (1993). "Formulación y nomenclatura química inorgánica" . Barcelona, EDUNSA - Skoog, Douglas A (2007). "Principios de análisis instrumental" . Santa Fe : Cengage Learning - José Vale Parapar y col. (2004). "Problemas resueltos: de Química para Ingeniería" . Thomson - KOTZ, TREICHEL, HARMAN (2003). "Química y reactividad química" . Thomson Ed. 5º Ed. - PAZ, M.; CASTRO, F. y MIRO, J. (1995). "Química" . Madrid.Ed.UNED - WILLIS (1995). "Resolución de Problemas de Química General" . Reverté

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Enxeñaría Medioambiental/770G01014
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.