Teaching Guide				
Identifying Data				2023/24
Subject (*)	Chemistry		Code	770G01004
Study programme	Grao en Enxeñaría Electrónica Industrial e Automática			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	First	Basic training	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química			
Coordinador	Alonso Rodriguez, Elia	E-mail	elia.alonso@udc.es	
Lecturers	Alonso Rodriguez, Elia González Rodríguez, María 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.
B7	Capacidade para traballar de forma colaborativa e de motivar un grupo de traballo.
C2	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.	A8		C2
Apply the basic laws governing reactions: thermodynamics, kinetics and equilibrium.	A8		C2
Solve problems and analyze results.	A8	B7	C2
Adequately apply theoretical concepts in the laboratory through the correct and safe use of basic material and equipment		B1 B4	
Use rigorous language in chemistry		B2	
Present and interpret data and results		B6 B7	

Contents	
Topic	Sub-topic
Unity 1. Chemistry basics	Includes topic 1
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.

Unity 2. Thermochemistry	Includes topic 2
Topic 2. Thermochemistry	- Heats of Chemistry Reaction - Enthalpy - Calorimetry - Introduction to thermodynamics
Unity 3. Rates of Reaction	Includes topic 3
Topic 3. Rates of Reaction	- Reaction Rates - Reaction Rates Equation - Dependence of Rate on Concentration - Activation energy - Catalysis - Mechanism
Unity 4. Chemical Equilibrium	Includes topic 4
Topic 4. Chemical Equilibrium	- Chemical Equilibrium. The Equilibrium Constant. - Gaseous Reactions. Le Chatelier's Principle - Acid-Base Equilibria
Unity 5. Electrochemistry	Includes topics 5 and 6
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
Unity 6. Corrosion	Includes topic 7
Topic 7. Corrosion	- Concept - Corrosion process and influence factors - Methods to protect metals from corrosion - Atmospheric Corrosión - Marine Corrosion
Unity 7. Principles of Organic Chemistry	Includes topic 8
Topic 8. Organic Chemistrya	- Introduction to Organic Chemistry - Functional Groups - Nomenclature - Isomers - Main types of organic reactions
Unity 8. Organic and Inorganic Chemistry Applied to Engineering	Incledes topics 9 and 10
Topic 9. Organic Chemistry Applied to Engineering	- Carbon - Oil - Gas - Biomass - Polymers
Topic 10. Inorganic Chemistry Applied to Engineering	- Metallurgy - Industrial Inorganic Compounds: Synthesis - Main Technologic Inorganic Materials: Semiconductors, Optic Fiber, Ceramic, Superconductors
Unity 9. Bases of Industrial Chemistry: Mass Balance	Includes topic 11
Topic 11. Introduction to Industrial Chemistry	- Engineering Process - Mass Balance
Unnity 10. Principles of Instrumental Analysis	Includes topic 12

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	30	43.5	73.5
Problem solving	A8 B1 B7	19	28.4	47.4
Laboratory practice	A8 B4 B6 B7 C2	5	2.5	7.5
Supervised projects	B2 B6 B7 C2	1	1.5	2.5
Seminar	B2 B6 B7	1	0.5	1.5
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	Students take notes and make questions
Problem solving	Resolution of questionnaires and exercise bulletins. Students work individually or in groups, raise doubts and questions and account for what they have learned.
Laboratory practice	Students perform an experiment following a written procedure and write a report
Supervised projects	Students summarize and discuss information
Seminar	Study of a topic through dialogue between students, preparation of a document and conclusions
Objective test	Students 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 B6 B7 C2	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 3 points, minimum score 1.25 points to compensate. - Problems, maximum score 3 points, 1.25 points minimum to compensate score.	60

Problem solving	A8 B1 B7	Resolution of questionnaires,exercises and ability to explain them in the classroom	15
Laboratory practice	A8 B4 B6 B7 C2	Carry out the laboratory practices and reports. Ability to work collaboratively.	10
Seminar	B2 B6 B7	Elaboration of a synthesis of a topic from bibliographic documents, questionnaires and dialogue between students	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. For the evaluation of the second opportunity, thesame continuous evaluation activities can be carried out as during the courseexcept for laboratory practices and instead, some questionnaires can be carried out in Moodle For students being recognized officially as partial-time and entitled not to attend the lectures, the final exam represent 80% of the final grade and supervised projects 20%. The fraudulent performance of the tests or evaluation activities will directly imply the failure grade '0' in the matter in the corresponding call, thus invalidating any qualification obtained in all the evaluation activities for the extraordinary call

Sources of information	
Basic	- http://eup.cdf.udc.es (). . - VINAGRE F., VAZQUEZ DE MIGUEL L.M. (1996). "Fundamentos y problemas de química" . Alianza, 4ª 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 (2012). "Fundamentos de nomenclatura química" . Reverte - 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
Environmental Engineering/770G01014
Other comments

Recommendations Sustainability Environment, Person and Gender Equality:1.
The delivery of the works (supervised work) that
are carried out in this matter will be done in the following way:
1.1. It will be delivered in virtual format and / or computer support
1.2. In the case of having to print something on paper, it will be made
on recycled and double-sided paper. Drafts will not be printed, only the
final version.2. It must make a sustainable use of resources and
the prevention of negative impacts on the natural environment. It will
be encouraged that the materials that are discarded in the matter
(papers, plastics) are thrown in the respective containers enabled in
the streets for such purpose.3. It will try to convey to students
the importance of ethical principles related to the values ??of
sustainability so that they apply not only in the classroom, but in
personal and professional behaviors.4. The gender perspective
must be incorporated in this subject, so the works delivered by the
students and the material prepared by the teacher must use non-sexist
language.5. It will facilitate the full integration of students
who for physical, sensory, psychic or sociocultural reasons, experience
difficulties to an adequate, equal and profitable access to university
life.