UNIVERSIDADE DA CORUÑA

Teaching Guide					
Identifying Data					2022/23
Subject (*)	General Chemistry 3			Code	610G01009
Study programme	Grao en Química				
Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	2nd four-month period	First		Basic training	6
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	Química				
Coordinador	Carlosena Zubieta, Alatzne		E-mail	alatzne.carlosena@udc.es	
Lecturers	Alonso Rodriguez, Elia Carlosena Zubieta, Alatzne Castro Romero, Jesús Manuel		E-mail	elia.alonso@udc.es alatzne.carlosena@udc.es jesus.castro.romero@udc.es	
Web					
General description	The subject "Chemistry 3" belongs to chemistry module, the first year of the Degree in Chemistry. It examines the most important aspects of chemical equilibria in solution, which are the basis of many chemical processes of inorganic, organic, analytical and physical chemistry.				

Study programme competences	
Code	Study programme competences
A1	Ability to use chemistry terminology, nomenclature, conventions and units
A4	Knowledge of main types of chemical reaction and characteristics of each
A5	Understanding of principles of thermodynamics and its applications in chemistry
A6	Knowledge of chemical elements and their compounds, synthesis, structure, properties and reactivity
A7	Knowledge and application of analytical methods
A12	Ability to relate macroscopic properties of matter to its microscopic structure
A16	Ability to source, assess and apply technical bibliographical information and data relating to chemistry
A17	Ability to work safely in a chemistry laboratory (handling of materials, disposal of waste)
A19	Ability to follow standard procedures and handle scientific equipment
A20	Ability to interpret data resulting from laboratory observation and measurement
A21	Understanding of qualitative and quantitative aspects of chemical problems
A23	Critical standards of excellence in experimental technique and analysis
A25	Ability to recognise and analyse link between chemistry and other disciplines, and presence of chemical processes in everyday life
B2	Effective problem solving
B3	Application of logical, critical, creative thinking
B4	Working independently on own initiative
B5	Teamwork and collaboration
C1	Ability to express oneself accurately in the official languages of Galicia (oral and in written)
C3	Ability to use basic information and communications technology (ICT) tools for professional purposes and learning throughout life

Learning outcomes	
Learning outcomes	Study programme competences

Knowledge of the nomenclature, structure and reactivity of organic functional groups. Knowledge of chemical equilibrium, entropy, free energy, acid-base, complexation equilibrium, solubility equilibrium, balance and electrochemical redox.	A1 A4 A5 A6 A7 A12 A21 A25	B2 B3	C1 C3
Resolution and exposure problems of the chemistry of organic functional groups, the chemical equilibrium and types of chemical reactions (acid-base complex formation, solubility and redox).		B2 B3	C1 C3
Skill in the literature search of real applications and research related to the contents of the subject. Have sufficient knowledge and experimental skills to use correctly and safely the products and the usual stuff in a lab. Interpret results obtained in the laboratory.	A7 A12 A16 A17 A19 A20 A23	B3 B4 B5	C1 C3

Contents	
Topic	**Sub-topic**
Item 1. - Chemistry of organic functional groups.	Introduction to organic compounds and structures. Classification, nomenclature and properties of organic compounds as functional groups. Reactivity and main types of organic reactions. Stereoisomerism.
Item 2. - The chemical equilibrium.	General condition of equilibrium. Equilibrium constant. Homogeneous and heterogeneous equilibria. Relationship between kinetics and chemical equilibrium. The reaction quotient. Factors affecting chemical equilibrium. Le Chatelier's Principle. Equilibrium and Gibbs free energy.
Item 3. - Acid-base balance.	Acidity and basicity: definition of Arrhenius, Bronsted and Lewis. Autoionization of water. Concept of pH. Strength of acids and bases. Ionization constants. Polyprotic acids. Salt solutions: hydrolysis. Common ion effect. Buffer solutions. Acid-base indicators. Acid-base titration. Acid-base balance in nonaqueous medium. Pearson model.
Item 4. - Balancing complex formation.	General considerations. Types of ligands. Formation and dissociation constants. Acid-base reactions of complex ions. Kinetic aspects. Applications of Coordination Compounds.
Item 5. - Equilibrium solubility.	Salt solubility and solubility product. Precipitation reactions and reaction quotient. Fractional precipitation. Factors influencing the solubility of the salts is the common ion effect, effect saline, pH and complexation. Solubility and qualitative analysis.
Tema 6.- Equilibrium oxidation-reduction. Electrochemistry.	Basic concepts: redox reactions. Electrode potential and standard electrode potential. Equilibrium constants. Relationship between potential, Gibbs free energy and equilibrium constant. Variation of energy with concentration: Nernst equation. Mixed equilibria: influence of other equilibria. Electrochemical cells. Electrolysis.

Planning				
Methodologies / tests	**Competencies**	**Ordinary class hours**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A1 A4 A5 A6 A7 A12 A16 A21 A25 B2 B3 B4	24	48	72

Seminar	A1 A5 A6 A21 A25 B2 B3 B4 B5 C3	8	24.8	32.8
Laboratory practice	A7 A12 A16 A17 A19 A20 A23 B3 B4 B5 C1 C3	20	20	40
Objective test	A1 A4 A5 A6 A12 A20 A21 A25 B3 C1	1	0	1
Mixed objective/subjective test	A1 A4 A5 A6 A12 A20 A21 A25 B3 C1	2.2	0	2.2
Personalized attention		2	0	2
(*)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	The teacher will present the fundamental contents of each of the topics. For better learning, students will have to advance the development of these sessions teaching materials suitable for your personal preparation. All students can consult the teacher any aspect of the matter in the tutorial schedule established for this purpose. He taught in large group.
Seminar	Sessions devoted to the resolution of problems and issues with the active participation of students. He taught in small group.
Laboratory practice	In the laboratory sessions students will develop experimental examples of the theoretical exposed in the classroom. Will be essential to achieving the prelaboratorios before the relevant practice (but the student can not perform such practice) as well as keep up to date lab book, according to the instructions of the teacher. This will be carried out in small group. An initial meeting will be provided in large group students to explain the content and dynamics of practices.
Objective test	Periodically, in the guest lecture, in the seminars and/or in the Moodle virtual classroom, short tests will be carried out to evaluate the degree of acquisition of knowledge and skills by the students and to promote continuous assessment throughout the course.
Mixed objective/subjective test	The student will perform a joint test for verifying the degree of understanding and skills of the subject has gained. It will include questions and problems about the contents of the whole subject that will have to be solved in a reasoned way.

Personalized attention	
Methodologies	**Description**
Laboratory practice Seminar	Students will be invited to two 1-hour sessions of personalised attention to resolve any possible doubts and to provide guidance on the contents of the course. Students may also request tutorials with the teaching staff, who will resolve any doubts they may have and guide them through the study of the subject. Those students who take advantage of the "recognition of part-time dedication and academic waiver of attendance exemption" regimen according to the regulations of the UDC, will have specific attention, at their own request and at a time to be agreed, of tutorial help for orientation and Resolution of doubts about the contents of the subject. The student in this situation must speak with the responsible Professor in the first week of the course to replace the face-to-face regimen with other qualifying activities.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Laboratory practice	A7 A12 A16 A17 A19 A20 A23 B3 B4 B5 C1 C3	It will assess the performance of the prelaboratorios, abilities and skills of students in the experimental work, their ability to interpret the results, etc.	20

Seminar	A1 A5 A6 A21 A25 B2 B3 B4 B5 C3	It will be valued the resolution of questions and/or problems, compliance dates for delivery or revision and also the participation of the student through the raising of questions, before or after the development of the seminars.	10
Mixed objective/subjective test	A1 A4 A5 A6 A12 A20 A21 A25 B3 C1	It has two parts. In one of them will be evaluated the student's ability to express, summarize and develop theoretical aspects of the subject and, in the other, the resolution of problems and numerical exercises.	60
Objective test	A1 A4 A5 A6 A12 A20 A21 A25 B3 C1	Periodically, short tests/deliveries will be carried out in which students must answer questions or solve problems in a reasoned manner that allows them to evaluate their degree of understanding of the most important aspects of the subject.	10

Assessment comments

-To pass the subject you must:

1) Perform the laboratory practices.

2) Obtain a higher or equal to 5 points rating (out of 10) in the laboratory practices and in each part of the mixed test. If the total sum value was equal to or greater than 5 (out of 10) but this threshold mark was not met, the final mark will be 4.5 (fail).

-In the first and second time, students who do practices and obtain less than 5, have the opportunity to, in addition to the mixed test, perform a specific test related to the labs. The score of this test especcífica replaced the grade obtained in practice for the overall rating.

-Students who do not participate in the seminars activities and do not realize the objetive tests will score 0 in these sections (10% and 10%, respectively, of the overall grade). In the second opportunity, these grades will be maintained for the overall rating.-

The student will obtain the qualification of No Presented when the student does not assist to the laboratory practice and neither attend to the mixed test. As regards the successive academic years, the teaching-learning process, including continuous assessment, refers to an academic course and, therefore, would comezar a new course, including all activities and procedures the Assessment that is scheduled for that course. - Second Opportunity: The mixed test's mark obtained in the second opportunity will replace the first one's. The students tested on the second occasion shall be eligible for honors if the maximum number of these to the corresponding course not covered in full at the first opportunity.

In the case of exceptional, objective and adequately justified circumstances, the Responsible Teacher may exempt totally or partially a member of the student body from attending the continuous evaluation process. Students who are in this circumstance must pass a specific exam that leaves no doubt about the achievement of the competences of the subject.

Students with recognition of dedication and part-time academic exemption waiver assistance:

Conducting laboratory practices are mandatory and it will be provided within the flexibility to allow coordinating schedules and material and human resources. They shall be deemed exempt from the keynote sessions while assistance will be provided to the greatest number of seminars. If they can not attend the seminars will make a mentored work.Students in part-time study regime due to work or duly justified will have to talk to the Responsible Professor in the first week of the course to substitute the face-to-face regime with other type of gradable activities. These activities will be indicated in an individual work plan that will be given to the student.

In the evaluation of the subject, all that is established in article 14, regarding the Fraud Commission and disciplinary responsibilities, of the UDC's Rules for the Evaluation of Bachelor's Degrees and Master's Degrees will be applied: "The fraudulent performance of the evaluation tests or activities, once verified, will directly imply the grade of "0" in the subject in the corresponding call, thus invalidating any grade obtained in all evaluation activities in view of the extraordinary call."

Sources of information

Basic	- Petrucci, R.H.; Herring, F.G.; Madura, J.D.; Bissonnette, C. (2011). Química General: principios y aplicaciones modernas. 10ª Ed., Prentice Hall, Madrid. -Tamén existen edicións anteriores do libro de texto recomendado Petrucci. Por exemplo na biblioteca disponse de exemplares da 8ª Ed., con referencia: QX-240.

Complementary	- Reboiras, M.D. (2007). Problemas resueltos de Química. Madrid, Thomson Paraninfo, S.A. - Chang, R. L. (2013). Química. 11ª Ed., México: Mc Graw Hill. - Reboiras, M.D. (2006). Química. La ciencia básica . Madrid, Thomson Paraninfo, S.A. - Atkins, P.; Jones, L. (2012). Principios de Química. Los caminos del descubrimiento. 5ª Ed., Madrid: Ed. Médica Panamericana. - (). . En xeral calquera libro de texto de química xeral serve como guía de estudo para a materia.

Recommendations
Subjects that it is recommended to have taken before
General Chemistry 1/610G01007 Chemistry Laboratory 1/610G01010
Subjects that are recommended to be taken simultaneously
General Chemistry 2/610G01008
Subjects that continue the syllabus
Analytical Chemistry 1/610G01011 Physical Chemistry 1/610G01016 Inorganic Chemistry 1/610G01021 Organic Chemistry 1/610G01026 Chemistry Laboratory 2/610G01032
Other comments
To successfully overcome the matter, it is imperative that students have a number of prior knowledge of chemistry and mathematics, according to the level required in middle and high school, including: nomenclature and chemical formula, set of chemical reactions , stoichiometric calculations, acid-base character identification of common compounds, obtaining oxidation states of the elements in the chemical species, management of logarithms, exponents, etc.GREEN CAMPUS PROGRAM RECOMMENDATION: in order to help achieve an immediate sustainable environment and comply with point 6 of the "Environmental Declaration of the Faculty of Science (2020)", the documentary works requested in this subject:(a) Will be requested mostly in virtual format and computer support.(b) If paper is used: -No plastics will be used -Double-sided printing will be used -Recycled paper will be used -The use of drafts will be avoided.