UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2014/15
Subject (*)	Química 3		Code	610G01009
Study programme	Grao en Química			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	First	FB	6
Language	Spanish			
Prerequisites				
Department	Química Fundamental			
Coordinador	Martinez Cebeira, Monstserrat	E-mail	monserrat.martinez.cebeira@udc.es	
Lecturers	García Romero, Marcos Daniel Martinez Cebeira, Monstserrat Riveiros Santiago, Ricardo	E-mail	marcos.garcia1@udc.es monserrat.martinez.cebeira@udc.es ricardo.riveiros@udc.es	
Web				
General description	A materia "Química 3" pertence ao módulo de Química, do primeiro curso da titulación de Grao en Química. Nela estúdanse os aspectos máis relevantes dos equilibrios químicos en disolución, que constitúen a base de numerosos procesos da química inorgánica, orgánica, analítica e química física.			

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
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
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			
Subject competencies (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	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.	A17 A19	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. - 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.
Item 5. - 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 6. - Redox balance.	Oxidation-reduction processes in aqueous solution. Standard electrode potentials. Equilibrium constants for redox reactions. Cell potential and Gibbs free energy. Nernst equation. Mixed equilibria: the influence of other equilibria.
Item 7. - Electrochemistry.	Fundamentals of electrochemistry. Electrical conduction. Electrodes. Electrochemical cells. Cell potential and concentration. Electrochemical applications. Electrolysis.

Planning			
Methodologies / tests	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	14	21	35
Seminar	10	24	34
Supervised projects	8	28	36
Laboratory practice	20	20	40
Mixed objective/subjective test	3	0	3
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 best utilization, students will have to advance the development of these sessions teaching materials suitable for your personal preparation. He taught in large group. All students can consult the teacher any aspect of the matter in the tutorial schedule established for this purpose.
Seminar	Sessions devoted to the resolution of problems and issues with the active participation of students. He taught in large group.
Supervised projects	In the 8 sessions scheduled entrusted Professor preparing students in writing well in advance of some problems that must be resolved to take classes in a small group. In these sessions, students orally present any problems and answer questions raised about (oral or written) for evaluation.
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.
Mixed objective/subjective test	The student will perform a joint test for verifying the degree of understanding of the subject has gained. It will include combined theoretical questions, numerical exercises and questions about the practices.

Personalized attention

Methodologies	Description
Supervised projects Laboratory practice Seminar	The work developed by students in seminars, supervised works and laboratory practice involves personal attention from the teacher both in the resolution of questions as a guide to the preparation thereof, correction questionnaires, understanding fault indication etc.. In addition, Professor mention to the student individually to discuss in more depth how their learning progress of matter. Moreover, all students can consult the teacher any aspect of the subject in the tutorial schedule established for this purpose.

Assessment		
Methodologies	Description	Qualification
Supervised projects	To evaluate the student's progress and assimilation in small group classes will be considered, active participation and oral problems also entrusted the answers (oral or written) to the issues raised at these meetings. Valuable skills: B2, B3, C1, C3	15
Laboratory practice	It will assess the performance of the prelaboratorios, abilities and skills of students in the experimental work, their ability to interpret the results, etc. Valuable skills: A17, A19, B3, B4, B5, C1, C3	15
Mixed objective/subjective test	It will assess the student's ability to express, summarize and develop theoretical aspects of the subject and the resolution of problems and numerical exercises. Also assessed issues related to laboratory practice. Valuable skills: A1, A4, B2, B3, C1	70

Assessment comments
-To pass the subject you must obtain a higher or equal to 5 points overall rating (out of 10) in either opportunities. Matter shall not exceed those students be achieve a rating of less than 4 in the mixed test and laboratory practices. -The performance of the practices is necessary to pass the subject condition. -In the first and second time, students who do obtuviesen practices and 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 supervised work will score 0 in this section (20% of the overall grade) on two occasions. The second time the grade obtained in the course for the overall rating will be maintained. -The student will obtain the qualification of not submitted when making less than 25% of academic activities scheduled, and not presented to the joint proba. 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. -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.

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.
Complementary	- (). . - Atkins, P.; Jones, L. (2012). Principios de Química. Los caminos del descubrimiento. 5ª Ed., Madrid: Ed. Médica Panamericana. - 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.

Recommendations
Subjects that it is recommended to have taken before

Química Analítica 1/610G01011
Química Física 1/610G01016
Química Inorgánica 1/610G01021
Química Orgánica 1/610G01026
Laboratorio de Química/610G01032
Subjects that are recommended to be taken simultaneously
Química 2/610G01008
Subjects that continue the syllabus
Química 1/610G01007
Química 4/610G01010
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, differential and integral calculus, etc..