Teaching Guide				
Identifying Data				2021/22
Subject (*)	Chemistry		Code	610G02001
Study programme	Grao en Bioloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	First	Basic training	6
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Química			
Coordinador	Riveiros Santiago, Ricardo	E-mail	ricardo.riveiros@udc.es	
Lecturers	Herrero Rodriguez, Roberto Penedo Blanco, Francisco Jose Riveiros Santiago, Ricardo Rodríguez Rodríguez, Aurora Ruiz Bolaños, Isabel	E-mail	r.herrero@udc.es francisco.penedo.blanco@udc.es ricardo.riveiros@udc.es aurora.rodriguez@udc.es isabel.ruiz@udc.es	
Web				
General description	Chemistry in the Biology degree is a subject of basic training with contents focusing on some of the fundamental concepts of General Chemistry. Such knowledge and skills will establish the essential background for the students, allowing them to take up the study of the different branches of biology where the chemical phenomenon is involved.			
Contingency plan	1. Modifications to the contents - No modifications will be made. 2. Methodologies *Teaching methodologies that are maintained *Teaching methodologies that are modified - Keynote session, seminars and tutored works: (1) In case of no presence, they will take place in person through TEAMS at the time indicated in the official calendar. (2) In case of capacity problems in the spaces designated for the realization of face-to-face activities, additional spaces will be reserved in which students can follow the activities through the TEAMS platform.- Laboratory practices. (1) In the case of non-attendance, they will be carried out in "online mode", that is, using the ICT tools available to the institution. (2) In case of capacity problems in the designated spaces, the groups will be split to adapt to the capacity of the laboratory - Objective Test. It will take place in person through teams and Moodle at the time indicated in the official calendar. 3. Mechanisms for personalized attention to students - Email: Daily. The professors of the subject will be available for inquiries, virtual meetings to resolve doubts and activities monitoring. - Teams: Daily. The professors of the subject will be available for inquiries, virtual meetings to resolve doubts and activities monitoring. 4. Modifications in the evaluation - In the event that the final objective test cannot be carried out in person in the classroom, it will be carried out through the Moodle and Teams platforms. *Evaluation observations: 5. Modifications to the bibliography or webgraphy - No modifications will be made. Students already have all the necessary information through Moodle and the faculty library.			

Study programme competences	
Code	Study programme competences
A26	Deseñar experimentos, obter información e interpretar os resultados.
A30	Manexar adecuadamente instrumentación científica.
A31	Desenvolverse con seguridade nun laboratorio.
B1	Aprender a aprender.
B2	Resolver problemas de forma efectiva.
B3	Aplicar un pensamento crítico, lóxico e creativo.
B4	Traballar de forma autónoma con iniciativa.
C1	Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.

Learning outcomes	
Learning outcomes	Study programme competences

To learn the most important parts of this discipline: Nomenclature, structure and reactivity of the major organic functional groups, and thermochemistry, kinetics of chemical reactions, chemical equilibrium, acid-base equilibrium and electrochemistry and its importance in a biological medium.	A26	B1 B3 B4	
To acquire sufficient knowledge and experimental skills to use, properly and safely, the most common material and compounds in a chemical laboratory.	A26 A30 A31	B1 B3 B4	
To be able to solve and explain problems related to the chemistry of functional groups, thermochemistry, kinetics of chemical reactions, chemical equilibrium, acid-base equilibrium and electrochemistry, and to interpret the results.	A26	B1 B2 B3 B4	
To be able to adequately express the concepts and ideas learned.			C1

Contents	
Topic	**Sub-topic**
1. Organic Chemistry	? Introduction to Organic Chemistry ? Alkanes ? Alkenes and alkynes ? Aromatic hydrocarbons ? Alkyl halides ? Alcohols, fenols and ethers ? Aldehydes and ketones ? Carboxylic acids and their derivatives ? Amines and amides ? Stereochemistry
2. Thermochemistry	? Concepts and basic terms in Thermochemistry ? First law of Thermodynamics ? Heats of reaction. Enthalpy ? Thermochemical equations ? Calorimetry ? Standard enthalpy of formation: Hess's law ? Spontaneous change and Entropy ? Second law of Thermodynamics ? Criteria for spontaneous change. Gibbs's free energy
3. Chemical equilibrium	? Chemical equilibrium ? The equilibrium constant expression ? Relationship between kinetics and equilibrium ? Altering equilibrium conditions: Le Chatelier's principle ? Relationship between the equilibrium constant and Gibbs's free energy ? Standard state in Biochemistry ? Coupling reactions in biological systems
4. Acid-base equilibrium	? Acid and base definitions. The Brønsted-Lowry's theory ? Acid-base properties of water: concept of pH ? Strong and weak acids and bases. Ionization constants ? Solutions of salts: hydrolysis ? The common-ion effect ? Buffer solutions ? Acid-base titrations. Acid-base indicators ? pH control in biological systems

5. Electrochemistry	? Electrochemical processes and redox reactions ? Chemical energy and Electrochemistry. Electrochemical cells ? Standard electrode potentials ? Thermodynamics of electrochemical reactions ? Effect of the concentration on cell potential ? pH measurement ? Membrane potential ? Redox systems involving protons ? Redox indicators
6. Kinetics and Catalysis	? Definition of kinetics and objectives ? Variables influencing the rate of chemical reactions ? Rate of reaction and the rate law ? Effect of the temperature on reaction rates. The Arrhenius equation ? Relationship between kinetic constants and equilibrium constants ? Theoretical models in chemical kinetics ? Mechanisms of reaction: elementary and in-steps processes ? Catalysis

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Introductory activities	B1	1	0	1
Guest lecture / keynote speech	B1 B3	13	26	39
Seminar	B1 B2 B3 B4	10	30	40
Laboratory practice	A26 A30 A31 B1 B2 B3 B4 C1	15	15	30
Supervised projects	A26 B1 B2 B3 B4	8	20	28
Objective test	A26 B1 B2 B3 B4 C1	3	9	12
Personalized attention		0	0	0
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Introductory activities	Initial session to introduce the subject, where students will be informed about the contents of the course, the teaching methodology -for large and small groups- and the assessment criteria.
Guest lecture / keynote speech	The theoretical content will be discussed at the keynote sessions, through multimedia presentations given by the teaching staff. The presentations, covering the basic content, additional material and recorded videos of the sessions, will be available for the students at the Moodle platform.
Seminar	The seminars will address the analysis and resolution of some of the previously proposed exercises. In order to make the most of these sessions, it is very important that students work the exercises prior to their resolution in the classroom. The proposed exercises, and the data tables, will be available in advance at the Moodle platform.
Laboratory practice	Students will carry out 7 laboratory practices related to the theoretical contents that are addressed in the classroom and that will last 2 hours each. The students will have the script of the work that will be perfomed during each session and the previous materials (readings, videos, etc.) that will be reviewed before starting the experimentation. The teaching staff will explain the most relevant theoretical aspects of each practice. Students must previously read the script before entering the laboratory, and bring it with them. Each student will individually write a report/notebook of the practices, where he/she will include the objective and theoretical background of the practice, a scheme/picture of the employed material, the performed experiments, observations, and obtained results, as well as extract conclusions and answer the proposed questions. This report will be sent to the corresponding teacher using the Moodle platform, in .pdf format, for its evaluation.

Supervised projects	The main target of these sessions is the follow-up of the comprehension of the subject by the students. For this purpose, 8 sessions of 1 hour of tutoring in small groups are scheduled. Students must prepare each tutorial in advance, studying the corresponding contents and solving the exercises of the previous bulletins that will be available at the Moodle platform. Students must upload the solutions to the proposed exercises to Moodle previously to the tutorials. In the tutorials the proposed exercises will be solved and discussed on the board, preferably by the students. Brief short tests by surprise and/or through the Moodle platform can be carried out during these tutorials and they will contribute to the final assessment.
Objective test	The degree of concepts assimilation and problem solving skills of the students will be assessed by means of a written exam.

Personalized attention	
Methodologies	**Description**
Supervised projects	In addition to the follow-up work in group tutoring sessions, students can apply for individual tutoring, in the schedule set by the teachers, face to face or via Teams. In the specific case of part-time Students with exemption of attendance, seminars and supervised work will be led through individual and/or group tutoring schedule to be agreed with the teachers.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Laboratory practice	A26 A30 A31 B1 B2 B3 B4 C1	The completion of laboratory practices is mandatory. The score of the practices represents 20% of the overall score. The submitted report, the attitude and the work done in the lab will be assessed. To pass the subject is necessary to obtain a minimum score of 4 in this part.	20
Supervised projects	A26 B1 B2 B3 B4	The score of the supervised work represents 20% of the overall score. The individual work of the student with the previous questionnaires will be assessed as well as the active participation of the student in the tutorials, the attendance and the qualifications of the short tests in class and via Moodle.	20
Objective test	A26 B1 B2 B3 B4 C1	The objective test consists of a number of practical or theoretical-practical exercises, similar to those solved in seminars and tutorials. To pass the subject is necessary to obtain a minimum score of 4 in this part.	60

Assessment comments

To pass the subject it is necessary to obtain an overall rating equal to 5 points or higher (out of 10) in one of the two calls (January and July). A score below 4 on the objective test or laboratory practices implies failing the subject.
The completion of all the
laboratory practices is mandatory to pass the subject. Nevertheless, the student may miss 2 of the 7 sessions. If the student
does not justify the absence, the grade for that practice will be 0 and he/she
will not be able to recover it. If the absence is justified, whenever possible,
the experiments will be performed with another group, and if not possible, they
will not be taken into account in the evaluation. When the final grade of the laboratory practices is lower
than 4, the teacher will return the report, indicating the sources of error,
which must be corrected by the student and delivered for a new assesstment by
the teacher. The qualification of this second review will be definitive and will be applied for the calculation of the global
qualification, both in the first and in the second opportunity.
The attendance to the supervised work is mandatory to pass the subject. Students who attend less than 50% of those tutorials will obtain a qualification lower than 50% in this section for both assessment opportunities in January and July, regardless of their qualification obtained in the short tests during tutorials or via Moodle. In the second opportunity of July, in order to obtain the global qualification, the qualification obtained during the course in this section will be maintained.
In the specific case of students with recognition of part-time dedication
and academic assistance waiver, the mark of the tutored work will be replaced
by that obtained in the personal tutorials, counting as 20% of the overall
grade in the first and the second opportunities. In case of exceptional, and
appropriately justified circumstances, the teacher may fully or partly exempt
any student to perform the continuous evaluation process. In such case the students
will undergo a specifically designed test, in any of the opportunities
scheduled. In this specific case, the student will
perform the laboratory practices in the group with the schedule that best fits
his/her situation.
"Not attended" assessment mark will be applied when the students attend less than 25% of the planned academic activities (supervised work and practices), and do not assist to the objective test.
Fraudulent performance of tests or evaluation activities, after verification, will directly imply a qualification of failure (0) in the corresponding oportunity.

Sources of information	
Basic	- Petrucci, R.H.; Herring, F.G.; Madura, J.D.; Bissonnette, C. (2017). Química general: Principios y aplicaciones modernas (11ª Ed). Madrid: Pearson En xeral, calquera manual de Química Xeral actualizado é axeitado para o estudo da asignatura.Existen edicións anteriores do Petrucci (8ª Ed. QX240, 10ª Ed. QX-243) e outros libros recomendados a disposición dos alumnos na biblioteca, incluindo acceso electrónico a 10ª Edición en español e versión en inglés.

Complementary	- Chang, R.L.; Goldsby, K.A. (2017). Química (12ª Ed). México: McGraw-Hill - Atkins, P.; Jones, L. (2012). Principios de Química. Los caminos del descubrimiento (5ª Ed). Madrid: Ed. Médica Panamericana - Reboiras, M. D. (2007). Química, La ciencia básica. Madrid: Thomson - Brown, T.L.; LeMay Jr. H.E.; Bursten, B.E.; Murphy, C.J.; Woodward, P.M. (2014). Química. La ciencia central (12ª Ed). México: Pearson - Reboiras, M. D. (2007). Problemas resueltos de: Química, la ciencia básica. Madrid: Thomson - Paterno Parsi, A.; Parsi, A.; Pintauer, T.; Gelmini, L.; Hilts, R. W. (2011). Complete Solutions Manual: General Chemistry, Principles and Modern Applications. Scarbough: Pearson Canada - Paterno Parsi, A.; Parsi, A.; Pintauer, T.; Gelmini, L.; Hilts, R. W. (2011). Selected Solutions Manual: General Chemistry, Principles and Modern Applications. Toronto: Pearson - Rodríguez Yunta, M. J.; Campayo Pérez, L.; Cano Benjumea, M. C.; Sanz Plaza, A. M. (2013). Problemas de Química para Estudiantes de Biología. Madrid: Síntesis - López Cancio, J. A. (2010). Problemas de Química. Madrid: Prentice Hall - Quiñoá, E. (2005). Nomenclatura y representación de los compuestos orgánicos. Una guía de estudio y autoevaluación. Madrid: McGraw-Hill

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Mathematics/610G02003
Subjects that continue the syllabus
Biochemistry I/610G02011 Biochemistry II/610G02012
Other comments
In order to successfully study the subject, it is imperative that the student has a previous knowledge of chemistry and mathematics, according to the level in secondary and high school, such as: chemical nomenclature, balance of chemical reactions, stoichiometric calculations, identification of acid-base character of common compounds, oxidation states calculation of elements in chemical species, logarithms, exponential and basic differential and integral calculus.With the aim of reducing the paper consumption, and following the guidelines of the faculty´s ?Green Campus?, it is highly recommended to send the report in .pdf format.

(*)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.