Teaching Guide				
Identifying Data				2020/21
Subject (*)	Organic Chemistry 1		Code	610G01026
Study programme	Grao en Química			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Obligatory	6
Language	SpanishEnglish			
Teaching method	Hybrid			
Prerequisites				
Department	Química			
Coordinador	Ruiz Pita-Romero, Maria	E-mail	maria.ruiz.pita-romero@udc.es	
Lecturers	García Romero, Marcos Daniel Ojea Cao, Vicente Pazos Chantrero, Elena Ruiz Pita-Romero, Maria	E-mail	marcos.garcia1@udc.es vicente.ojea@udc.es elena.pazos@udc.es maria.ruiz.pita-romero@udc.es	
Web	campusvirtual.udc.es/moodle/			
General description	The course provides basics of Organic Chemistry for students of Chemistry			
Contingency plan	1. Modifications to the contents: without changes 2. Methodologies *Teaching methodologies that are maintained: all (lectures, seminars, workshops and practices) *Teaching methodologies that are modified: All the methodologies are adapted to the virtual modality through Moodle and Teams and the planning established in the coordination calendar of the Center is maintained. Specifically, the mixed objective test will consist of an individual manuscript exam, performed asynchronously through Moodle. In the case that the coordination with the rest of the subjects allows it, the possibility of fragmenting the mixed objective test into several tests carried out throughout the teaching period is contemplated. 3. Mechanisms for personalized attention to students: The personalized attention will be carried out through email or the Moodle platform at the request of the students and, as far as possible, at the time established for the tutorials. For students with part-time dedication or specific learning modalities or diversity support, personalized attention will be provided within the flexibility allowed by coordination schedules, and material and human resources. 4. Modifications in the evaluation: without changes, contributions to the final marks of all evaluable methodologies are maintained. *Evaluation observations: all the observations included in the teaching guide are maintained. 5. Modifications to the bibliography or webgraphy: without modifications, all the necessary materials will be available in Moodle or through access to the electronic resources available in the Faculty Library.			

Study programme competences / results	
Code	Study programme competences / results
A1	Ability to use chemistry terminology, nomenclature, conventions and units
A4	Knowledge of main types of chemical reaction and characteristics of each
A6	Knowledge of chemical elements and their compounds, synthesis, structure, properties and reactivity
A9	Knowledge of structural characteristics of chemical and stereochemical compounds, and basic methods of structural analysis and research
A10	Knowledge of chemical kinetics, catalysis and reaction mechanisms
A14	Ability to demonstrate knowledge and understanding of concepts, principles and theories in chemistry
A15	Ability to recognise and analyse new problems and develop solution strategies

A21	Understanding of qualitative and quantitative aspects of chemical problems
B2	Effective problem solving
B3	Application of logical, critical, creative thinking
B4	Working independently on own initiative
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 / results		
Understand and know basic concepts, principles and theories related to Organic Chemistry	A1 A4 A6 A9 A10 A14 A15 A21	B2 B3 B4	C1
Use Organic Chemistry terminology, including nomenclature, main conventions, and units	A1 A6 A9 A14	B2 B3	C1 C3
Know the caracteristics and propierties of organic compounds.	A1 A9 A14 A21	B2 B3	
Adquire the ability to solve estructural and synthetic problems in Organic Chemistry through the analysis of the present functional groups and the application of the acquired knowledge regarding their properties and reactivity	A1 A4 A9 A14 A15 A21	B2 B3 B4	C3
Know the main types of organic reactions, their mechanistic pathways and their main stereochemical features.	A1 A4 A6 A9 A10 A21	B2 B3 B4	C1 C3
Acquire the ability to use literature, as well as to search for specific information in Organic Chemistry	A6 A9 A14	B3 B4	C1 C3

Contents	
Topic	Sub-topic
Unit 1. Structure and reactions of organic compounds	Characteristics, structure and bonding of organic compounds: functional groups, Lewis structures, hybrid atomic orbitals, resonance. Organic Reactions: classification, types of reagents, types of reaction mechanisms. Thermodynamic and kinetic features of organic reactions. Kinetic and thermodynamic control. Reaction intermediates.

Unit 2. Stereoisomerism	Nomenclature, properties and isomerism of alkanes. Constitutional isomerism and stereoisomerism. Conformational isomerism: conformational analysis of alkanes and cycloalkanes, Newman projections. Optical isomerism, chirality and symmetry. Enantiomers and diastereoisomers: nomenclature, Fischer projections. Resolution of racemic mixtures.
Unit 3. NMR Spectroscopy	Basic principles of the NMR. Most important nuclei in Organic Chemistry. Chemical shift, Spin-spin coupling: N+1 rule. Identification of functional groups by NMR.
Unit 4. Alkanes	Halogenation, pyrolysis, cracking, combustion.
Unit 5. Alkyl Halides	Nomenclature, structure and properties. Nucleophilic substition reactions (SN): factors determinig the mechanism of nucleophilic substitutions: substrate (structure of the alkyl group and nature of the leaving group), nucleophilicity of the reagent and solvent effects. Elimination reactions. Competitive proccesses in the SN reaction: transpositions and eliminations. Organometallic compounds. Reduction of alkyl halides.
Unit 6. Alcohols	Nomenclature, structure and properties. Acid-base behavior. O-H bond reactions. C-O bond reactions. Oxidation. Thiols.
Unit 7. Ethers	Nomenclature, structure and properties. Ether cleavage. Epoxides. Thioethers.
Unit 8. Amines	Nomenclature, structure and properties. Acid-base reactions. Alkylation of amines. Hofmann's elimination. Oxidation: Cope's elimination.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 A4 A6 A9 A10	20	30	50
Seminar	A1 A4 A6 A9 A10	10	25	35
Workshop	A1 A4 A6 A9 A10 B2 B4 C1	10	30	40
ICT practicals	A6 A9 A21 B2 B4 C3	10	10	20
Mixed objective/subjective test	A1 A4 A6 A9 A10 A14 A15 A21 B2 B3 C1	4	0	4
Personalized attention		1	0	1
(*)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 unit. The slides will be available in Moodle before the class. With the help of these materials and other bibliographic resources, students must prepare the lessons before the lectures. The participation of the students will be encouraged during the lectures (or before/after the class by e-mail).
Seminar	Sessions dedicated to solving problems and questions with an active participation of the student. Problems to be solved will be available on Moodle before the seminars. Students must work on the problems before the seminars.
Workshop	The workshops are work sessions organized in small groups. The teacher will assign the students the preparation of some problems, which may require the integration of contents from different units. Students must prepare and hand in solutions for the assigned problems before the workshops through Moodle. During the workshop sessions the students will present the problems and answer the questions that arise.
ICT practicals	Two practicals will be carried out, oriented to the use of computer tools for: (1) the analysis and resolution of stereochemistry problems and (2) the structural determination of organic compounds based on the analysis of 1H NMR spectra. Students must prepare and hand in (through Moodle) a report of each one of the practicals.

Mixed objective/subjective test	In order to evaluate the knowledge and the ability to apply the subject contents by the student, a mixed test is scheduled. The test will include questions and problems analogous to those solved in the seminar and workshop sessions during the course, related to nomenclature, structure, structural determination, reactivity and synthesis of organic compounds.

Personalized attention	
Methodologies	**Description**
ICT practicals Workshop	Students will have the help of the teacher (during the tutorials schedule) for the resolution of doubts and questions that may arise during the study of the contents, the elaboration of solutions to the problems to be exposed in the workshops or the preparation of the practical reports. The monitoring will be done, as far as possible, in person or virtually through email or Moodle. For students with part-time dedication or specific learning modalities or diversity support, personalized attention will be provided within the flexibility allowed by the coordination schedules and material and human resources.

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Mixed objective/subjective test	A1 A4 A6 A9 A10 A14 A15 A21 B2 B3 C1	It will take place during the official examination period, on the dates established by the Center. The test will consist of a written exercise with problems and questions analogous to those solved in the seminars, workshops and practicals.	60
ICT practicals	A6 A9 A21 B2 B4 C3	The participation in the practicals will contribute with a 5% to the assessment. The practical reports handed in through Moodle will contribute with a 10% to the assessment.	15
Workshop	A1 A4 A6 A9 A10 B2 B4 C1	(1) the reports handed in through Moodle, (2) the attendance and participation through questions or answers during the sessions and (3) the quality of the presentations of the problems will be evaluated, taking into account the use of the appropriate nomenclature for the compounds and reactions, the clarity and specificity of the explanations and the answers to the questions that arise.	25

Assessment comments
The attendance to the practicals is a requirement to pass the subject. In order to pass the subject, it will be necessary to obtain a grade of 5 or higher (out of 10) in the mixed test. Therefore, if the minimum score is not reached in the mixed test, the student will receive a failing grade, even if the average grade is equal to or greater than 5 (in which case the grade will be 4.5). Students who have not completed the practices and do not attend to the mixed test will receive the grade of Non Presented. The qualifications of the ITC practicals and the workshops will be maintained in the second opportunity. Therefore, in the second opportunity, students can only take a mixed test, which grade will replace the one obtained in the mixed test of the first opportunity. The students evaluated in the second opportunity will only be able to obtain the grade "with Honors" if the maximum number of these for the corresponding course has not been fully covered in the first opportunity. Students with recognition of part-time dedication will be evaluated with the criteria set forth above. Students with academic exemption are exempt from attending the workshops (25% of the global grade) and may be evaluated only by the ITC practicals and the mixed test, both in the first and in the second opportunity. For students who qualify for the workshop attendance waiver, the mixed test will contribute 85% of the overall grade. The attendance to the ITC practicals is a requirement to pass the subject and will be facilitated as far as possible, within the flexibility allowed by the coordination schedules and material and human resources. In the case of exceptional, objective and properly justified circumstances, the QO1 coordinator could exempt a student from the continuous evaluation of the practicals. The student under in this circumstance must pass a specific exam that leaves no doubt about the achievement of knowledge, skills and competencies of the subject (corresponding to 100% of the grade).

Sources of information	
Basic	- K. P. C. Vollhardt, N. E. Schore (2008). Química Orgánica: estructura y función. Omega - L.G. WADE, Jr. (2012). Química Orgánica (7ª ed). Pearson Educación - E. QUIÑOÁ y R. RIGUERA (2004). Cuestiones y Ejercicios de Química Orgánica (2ª ed). Madrid, McGraw-Hill - K.P.C. VOLLHARDT and N.E. SCHORE (2011). Organic Chemistry 6th eddition. WH Freeman and Company - T. W. G. Solomons, C. B. Fryhle (2008). Organic Chemistry. John Wiley & Sons
Complementary	

Recommendations
Subjects that it is recommended to have taken before
General Chemistry 1/610G01007 General Chemistry 2/610G01008 General Chemistry 3/610G01009 Chemistry Laboratory 1/610G01010
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Organic Chemistry 2/610G01027 Intermediate Organic Chemistry/610G01028 Experimental Organic Chemistry/610G01029 Advanced Organic Chemistry/610G01030
Other comments
We highly recommend as main sources of information the books: Wade 2012 and Vollhardt, 2007. We also recommend the reading of the main subjects of each topic, as preparation to the teacher's keynote lectures.