



Teaching Guide

Teaching Guide				
Identifying Data				2017/18
Subject (*)	Organic Chemistry 1		Code	610G01026
Study programme	Grao en Química			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Obligatoria	6
Language	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química			
Coordinador	Peinador Veira, Carlos	E-mail	carlos.peinador@udc.es	
Lecturers	Ojea Cao, Vicente Peinador Veira, Carlos Perez Sestelo, Jose Ruiz Pita-Romero, Maria	E-mail	vicente.ojea@udc.es carlos.peinador@udc.es jose.perez.sestelo@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			

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
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		
Understand basic concepts, principles and theories related to the Organic Chemistry	A1 A4 A6 A9 A10 A14 A15 A21	B2 B3 B4	C1



Use and get use to the Organic Chemistry Nomenclature, using main conventions and units	A1 A6 A9 A14	B2 B3	C1 C3
Understand the characteristics and main properties of organic compounds.	A1 A9 A14 A21	B2 B3	
Adquire the expertise to solve structural and synthetic problems in Organic Chemistry being able to relate functional groups and their reactivities.	A1 A4 A9 A14 A15 A21	B2 B3 B4	C3
Understand the most important type of organic reactions, the mechanistic pathways and its stereochemical features.	A1 A4 A6 A9 A10 A21	B2 B3 B4	C1 C3
Adquire expertise in literature searches from Organic Chemistry sources.	A6 A9 A14	B3 B4	C1 C3

Contents	
Topic	Sub-topic
Unit 1. Organic reactions	Chemistry of the organic compounds: acids and bases, oxidants and reductors, electrophilicity and nucleophilicity. Reaction mechanisms: classification. Thermodynamic and kinetic features of Organic Reactions. Kinetic and thermodynamic control. Reaction intermediates.
Unit 2. Alkanes and cycloalkanes	Structural and physical properties. Rotational barriers. Conformational isomerism. Ring strain.
Unit 3. Stereochemistry	Optical activity. Chirality. Enantiomers and diastereoisomers: Nomenclature. Stereoisomerism in cyclic molecules.
Unit 4. NMR Spectroscopy	Basic principles of the NMR. The most important nuclei studied in Organic Chemistry. Chemical shift, Spin-spin coupling: N+1 rule. Identification of Organic functional groups by NMR.
Unit 5. Alkyl Halides	Structure and properties. Nomenclature. NMR spectroscopic properties. Nucleophilic substitution reactions (S _N): substrate (structure of the alkyl group and nature of the leaving group, nucleophilicity of the reagent and solvent effects. Competitive processes in the S _N reaction: transpositions and eliminations. Organometallic compounds. Reduction of alkyl halides.
Unit 6. Alcohols	Nomenclature, structure and physical properties. Acid-base character. Reactions through the O-H bond. Reactions through the C-O bond. Oxidation. Thiols.
Unit 7. Ethers	Chemical structure. Ether cleavage. Epoxides. Thioethers.
Unit 8. Amines	Structure and properties. Acid-base reactions. Alkylation of amines. Hoffman's elimination. Oxidation: Cope's elimination.

Planning



Methodologies / tests	Competencies	Ordinary class hours	Student's personal work hours	Total hours
Mixed objective/subjective test	A1 A4 A6 A9 A10 A14 A15 A21 B2 B3 C1	4	0	4
Guest lecture / keynote speech	A1 A4 A6 A9 A10	30	45	75
ICT practicals	A6 A9 A21 B2 B4 C3	10	10	20
Workshop	A1 A4 A6 A9 A10 B2 B4 C1	10	40	50
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
Mixed objective/subjective test	A final exam will be introduced at the end of the semester. This is planned to objectively assess the degree of understanding by the student, as well as the ability to apply the course contents. This test will include a single type of questions (related to the structure, structural elucidation, reactivity and synthesis of organic compounds), in order to determine whether the answers are correct or not.
Guest lecture / keynote speech	The teacher presents the basic contents of each unit. These materials will be provided in advance to the students in order to study them before the development of the class. This methodology is intended to the whole group.
ICT practicals	Practicals will be mainly focused on two aspects: 1. The use of software tools for the three-dimensional representation of organic compounds, and the application of such tools on solving stereochemistry and conformational analysis problems. 2. The structural elucidation of organic compounds by means of proton NMR with the support of software for the simulation of spectra.
Workshop	The teacher will assign students the preparation of some problems, that would require the integration of contents from different subjects. Then, students should study the problems and prepare a solution in writing, which must be submitted to the teacher prior to the development of these activities in the classroom. During the classes, students will present orally some of the problems assigned, and will have to answer to issues that may arise in this regard.

Personalized attention	
Methodologies	Description
ICT practicals Workshop	The student will have the help of the professor for the resolution of the doubts that pose him during the study of the contents and in the preparation of the reports of laboratory and workshops. For the students with partial-time dedication or of specific modalities of learning or of support to the diversity the personalised attention will be facilitated inside the flexibility that allows the schedules of coordination and the material and human resources.

Assessment			
Methodologies	Competencies	Description	Qualification
Mixed objective/subjective test	A1 A4 A6 A9 A10 A14 A15 A21 B2 B3 C1	Final written test.	75
ICT practicals	A6 A9 A21 B2 B4 C3	The follow up and participation on the practical sessions will contribute a 5% to the final grading. The students will have to deliver a written final report of the practicals. This report will contribute another 5% to the evaluation.	10



Workshop	A1 A4 A6 A9 A10 B2 B4 C1	Attendance, participation, and the quality of the written solutions in the take home assigned problems will be evaluated. The students will deliver the written solutions before of each presentation. Additionally the clarity and precision of explanations, as well as the use of appropriate nomenclature for the compounds and reactions it will be evaluated.	15
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Assessment comments

The assistance to the ICT practical is a necessary requirement for passing the course.

The final grade will be based on your performances in the all activities. The exam will make up 70%, ICT practicals 10%, and workshop 20%. The exam should reach a minimum score of 5 out of 10. The scores obtained on the practicals and workshop classes will be preserved to the "second opportunity" of an academic course. Those students participating in less than a 75% of the planned activities will obtain an assesment of "not attended".

Students evaluated in the "second chance" shall be eligible for "class honors" if the maximum number of those marks for the corresponding course has not been fully covered in the "first opportunity".

Part-time dedication students with academic waiver exempting assistance, will be provided with a flexible schedule according with coordination time-table, available material and human resources. The remaining activities (seminars and workshop) will be evaluated in the final written test.

Part-time dedication students unable to attend the ICT practicals, will be evaluated with complemetary questions about the laboratory practices in the final writing test. This part will account for the 10% of the final grade.

Sources of information

Basic	<ul style="list-style-type: none">- K.P.C. VOLLHARDT and N.E. SCHORE (2011). Organic Chemistry 6th edition. WH Freeman and Company- L.G. WADE, Jr. (2004). QUÍMICA ORGÁNICA (5ª ed). Madrid, Pearson Educación- E. QUIÑOÁ y R. RIGUERA (2004). CUESTIONES Y EJERCICIOS DE QUÍMICA ORGÁNICA (2ª ed). Madrid, McGraw-Hill- 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 2004 and Vollhardt, 2007. We also recommend the reading of the main subjects of each topic, as preparation to the teacher's keynote lectures.

(*)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.