UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2016/17
Subject (*)	Profundización en Química Orgánica		Code	610509004
Study programme	Mestrado en Investigación Química e Química Industrial (plan 2016)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	Yearly	First	Obligatoria	3
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química Fundamental			
Coordinador	Sarandeses Da Costa, Luis Alberto	E-mail	luis.sarandeses@udc.es	
Lecturers	Martinez Cebeira, Monstserrat Sarandeses Da Costa, Luis Alberto	E-mail	monserrat.martinez.cebeira@udc.es luis.sarandeses@udc.es	
Web				
General description	This course is part of the Formación Obligatoria Avanzada module, where full knowledge of the main mechanisms of organic reactions and methods for their determination, and also studied the synthetic methodology used in the preparation of organic compounds. It is essential for study next courses of this area.			

Study programme competences	
Code	Study programme competences
A1	Define concepts, principles, theories and specialized facts of different areas of chemistry.
A2	Suggest alternatives for solving complex chemical problems related to the different areas of chemistry.
A4	Innovate in the methods of synthesis and chemical analysis related to the different areas of chemistry
B1	Possess knowledge and understanding to provide a basis or opportunity for originality in developing and / or applying ideas, often within a research context
B4	Students should be able to communicate their conclusions, and the knowledge and the reasons that support them to specialists and non-specialists in a clear and unambiguous manner
B5	Students must possess learning skills to allow them to continue studying in a way that will have to be largely self-directed or autonomous.
B7	Identify information from scientific literature by using appropriate channels and integrate such information to raise and contextualize a research topic
B10	Use of scientific terminology in English to explain the experimental results in the context of the chemical profession
B11	Apply correctly the new technologies to gather and organize the information to solve problems in the professional activity.

Learning outcomes			
Learning outcomes	Study programme competences		
Know in full the main mechanisms of organic reactions.	AC1 AC2 AC4	BC1 BC4 BC5 BC7 BC10 BC11	
Know the main methods used in the determination of mechanism in organic chemistry.	AC1 AC2 AC4	BC1 BC4 BC5 BC7 BC10 BC11	

Study in depth the synthetic methodology used in the preparation of organic compounds.	AC1 AC2 AC4	BC1 BC4 BC5 BC7 BC10 BC11	

Contents	
Topic	**Sub-topic**
Topic 1. Mechanisms of organic reactions	Introduction: reaction mechanisms, transition state, activation energy. Thermodynamic and kinetic control. Effect of solvent. Hammond postulate, Curtin-Hammett principle. Determination of reaction mechanisms. Effect of substituents: Hammett equation. Isotope effects. Acid and base catalysis. Characterization of intermediates.
Topic 2. Pericyclic reactions.	Frontier orbital theory. Woodward and Hoffmann rules. Cycloadditions: Diels-Alder reaction, [2 + 2], [3 + 2]. Sigmatropic rearrangements: Claisen, Cope, [2,3], [1, n], ene, cheletropic. Electrocyclic reactions.
Topic 3. Radicals and carbenes.	Structure. Preparation of radicals. Radical reactions: coupling, addition, fragmentation and transpositions. Formation of C-C inter- and intramolecular. Radical formation induced by metals. Carbenes. Diazomethane. Carbenes types. Reactions of carbenes: insertion into C-H bonds, rearrangements, metathesis.
Topic 4. Photochemical reactions.	General principles. Photochemistry and orbital structure. Photochemistry of carbonyl compounds, alkenes and dienes, and aromatics.
Topic 5. Synthetic methods and applications.	Introduction. Protecting groups. Synthetic equivalents. Retrosynthetic analysis: disconnections, chemoselectivity, functional group interconversion. Asymmetric synthesis, chiral pool, auxiliaries and chiral reagents, asymmetric catalysis. Examples.

Planning				
Methodologies / tests	**Competencies**	**Ordinary class hours**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A1 A2 A4 B7 B10 B11	16	16	32
Problem solving	A1 A2 A4 B1 B7 B10 B11	6	18	24
Mixed objective/subjective test	A1 A2 A4 B1 B4 B5 B7 B10 B11	2	0	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	Lección impartida polo profesor que pode ter formatos diferentes (teoría, problemas e/ou exemplos xerais, directrices xerais da materia...). O profesor pode contar con apoio de medios audiovisuais e informáticos pero, en xeral, os estudantes non necesitan manexalos en clase. Habitualmente estas clases seguirán os contidos dun Manual de referencia proposto na Guía Docente da materia. A asistencia a estas clases non é obrigatoria, pero resulta moi recomendable.

Problem solving	Clase teórico/práctica na que se propoñen e resolven aplicacións da teoría, problemas, exercicios. O alumno participa activamente nestas clases de distintas formas: entrega de exercicios ao profesor (algúns dos propostos en boletíns de problemas que o profesor entrega aos alumnos coa suficiente antelación); resolución de exercicios na aula, etc. O profesor pode contar con apoio de medios audiovisuais e informáticos pero, en xeral, os estudantes non os manexarán en clase. Inclúense as probas de avaliación se as houber. A asistencia a estas clases é obrigatoria.
Mixed objective/subjective test	O exame final versará sobre a totalidade dos contidos da materia.

Personalized attention	
Methodologies	**Description**
Problem solving	Scheduled by the teacher and coordinated by the Center. In general, each student will account for two hours per semester and subject. Monitoring activities as directed exercises, clarification of doubts about the theory or practice, problems, exercises, readings or other proposed tasks are proposed; and the presentation, presentation, discussion or comment made work individually or in small groups. In many cases the teacher will require students exercises delivery prior to the celebration of mentoring. These deliveries will come included in the calendar of activities to be undertaken by students throughout the course in the Teaching Guide of the corresponding subject. Attendance at these classes is mandatory.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Mixed objective/subjective test	A1 A2 A4 B1 B4 B5 B7 B10 B11	O exame final versará sobre a totalidade dos contidos da materia.	60
Problem solving	A1 A2 A4 B1 B7 B10 B11	A avaliación continua terá un peso do 40% na cualificación da materia e constará de dous compoñentes: clases de resolución de problemas e seminarios. A resolución de problemas e casos prácticos computará un 20%. Terase en conta así mesmo a asistencia e participación do alumno (10%).	30

Assessment comments

Sources of information	
Basic	- Clayden, J.; Greeves, N.; Warren, S. (2012). Organic Chemistry, 2nd Ed.. Oxford University press - Carey, F. A.; Sundberg, R. J. (2007). Advanced Organic Chemistry; 5th Ed.. Springer - Smith, M. B.; March, J. (2013). March's Advanced Organic Chemistry; 7th Ed.. Wiley
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Profundización en Química Analítica/610509001 Profundización en Química Física/610509002 Profundización en Química Inorgánica/610509003
Subjects that continue the syllabus

Análise Estrutural Avanzado/610509005
Mecanismos de reacción e catálise/610509009
Compostos organometálicos en síntese e catálise /610509011
Síntese estereoselectiva/610509012
Produtos e técnicas sintéticas/610509013
Other comments

(*)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.