Teaching Guide				
Identifying Data				2021/22
Subject (*)	Bioorganic and Supramolecular Chemistry		Code	610500019
Study programme	Mestrado Universitario en Ciencias, Tecnoloxías e Xestión Ambiental (plan 2012)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Optional	3
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química			
Coordinador	Jimenez Gonzalez, Carlos	E-mail	carlos.jimenez@udc.es	
Lecturers	Jimenez Gonzalez, Carlos	E-mail	carlos.jimenez@udc.es	
Web				
General description	The subject aims to provide students acquire knowledge and skills in the field of supramolecular and bioorganic chemistry. In the first part, the chemistry of natural products is discussed, followed by an introduction to biocatalysis. The last part of the subject is the study of the processes of molecular recognition and self-assembly.			
Contingency plan	1. Modifications to the contents There will be no changes 2. Methodologies *Teaching methodologies that are maintained All of them *Teaching methodologies that are modified The "magister classes and seminars" activities will maintain the same format and content with the only difference that they will be taught using Teams or the platform that the UDC makes available to the teaching community. The only change will include the face-to-face sessions of the "laboratory practices" methodology, which, if they cannot be taught in person, will be replaced by on line activities. The rest of the activities related to this methodology can be taught synchronously or asynchronously using the Moodle and Teams remote training platforms or others that the UDC makes available to the community. 3. Mechanisms for personalized attention to students Email: permanent. Moodle: Daily. According to the need of the students. Teams: Magister class, seminars, tutorials (2-6 h / week). 4. Modifications in the evaluation There will be no changes in either the methodology or the percentages assigned to each of the methodologies. *Evaluation observations: The evaluation will be maintained as indicated in the teaching guide. The only difference will be in the channel used for the tests that will be carried out in Teams or Moodle or a combination of them. 5. Modifications to the bibliography or webgraphy There are no changes in the bibliography.			

Study programme competences	
Code	Study programme competences

A1	Coñecemento das realidades interdisciplinares da Química e do Medio Ambiente, dos temas punteiros nestas disciplinas e das perspectivas de futuro.
A2	Deseño de novas especies químicas e materiais con propiedades determinadas.
A3	Capacitar ao alumno para o desenvolvemento dun traballo de investigación nun campo da Química ou do Medio Ambiente, incluíndo os procesos de caracterización de materiais, o estudo das súas propiedades fisicoquímicas e biolóxicas e dos procesos que poden sufrir no medio natural.
A4	Coñecer en profundidade as características e fundamentos de diversos modelos químicos para o estudo de sistemas orgánicos, inorgánicos e biolóxicos, incluídos os materiais con proxección tecnológica.
A8	Coñecer os fundamentos das interaccións intermoleculares e as súas aplicacións no campo da catálise supramolecular,recoñecemento molecular e biocatálise.
A20	Coñecemento dos principais tipos de produtos naturais: enzimas, receptores moleculares, etc. Entender a súa participación en procesos de catálise e autoensamblaxe.
B1	Posuír e comprender coñecementos que acheguen unha base ou oportunidade de ser orixinais no desenvolvemento e/ou aplicación de ideas, a miúdo nun contexto de investigación.
B2	Que os estudantes saiban aplicar os coñecementos adquiridos e a súa capacidade de resolución de problemas en contornas novas ou pouco coñecidos dentro de contextos máis amplos (ou multidisciplinares) relacionados coa súa área de estudo.
B3	Que os estudantes sexan capaces de integrar coñecementos e enfrontarse á complexidade de formular xuízos a partir dunha información que, sendo incompleta ou limitada, inclúa reflexións sobre as responsabilidades sociais e éticas vinculadas á aplicación dos seus coñecementos e suizos.
B5	Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que haberá de ser en gran medida autodirixido ou autónomo.
B7	Ser capaz de planificar adecuadamente desenvolvementos experimentais, a un nivel especializado.
C1	Ser capaz de traballar en equipos, especialmente nos interdisciplinares e internacionais.
C3	Ser capaz de adaptarse a situacións novas, mostrando creatividade, iniciativa, espírito emprendedor e capacidade de liderado.
C5	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.
C8	Entender a importancia da cultura emprendedora e coñecer os medios ao alcance das persoas emprendedoras.
C9	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C11	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes			
Learning outcomes	Study programme competences		
Understand the concept of natural product and learn its clasification, its main applications and major metabolic pathways	AC3 AC4 AC20	BC2	CC1 CC3
Learn the basics of biocatalysis and its main applications.	AC4 AC8 AC20	BC2 BC7	CC5 CC9
Learn the characteristics and properties of the main artificial molecular receptors.	AC1 AC2 AC3 AC4 AC8	BC1 BC2 BC3 BC5	CC9
Learn the most important aspects of supramolecular self-assembly.	AC2 AC8 AC20	BC1	CC8 CC11

Contents	
Topic	Sub-topic

Unit 1. Natural Product Chemistry.	Chapter 1. Interest of its study and the main applications Chapter 2. Main biogenetic routes of the secondary metabolite Chapter 3. Classification of natural products and illustrative examples.
Unit 2. Biocatalysis.	Chapter 1. Introduction to biocatalysis Chapter 2. Hydrolitic enzymatic reactions as a model of biocatalysis.
Unidade 3 Supramoelcular Chemistry	Tema 1 Introduction to Supramolecular Chemistry Tema 2 Molecular recognition of cations Tema 3 Molecular recognition of anions Tema 4 Molecular recognition of neutrl molecules Tema 5 Self-assembly and molecular devices.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A2 A8 A20 B1 B2 B3 B5 C8 C9 C11	13	40	53
Laboratory practice	A2 A8 A20 B1 B2 B7 C3 C1	10	10	20
Multiple-choice questions	A1 A2 A3 A4 A8 A20 B1 B2 C5	1	0	1
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 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.
Laboratory practice	Practicals will be mainly focused on two aspects: - Biocatalysis experiments - Supramolecular chemistry experiments
Multiple-choice questions	A final exam will be introduced at the end of the semester. This is planned to objectively asses the degree of understanding by the student, as well as the ability to apply the course contents.

Personalized attention	
Methodologies	Description
Laboratory practice	Personal attention for each student would be integrated on this methodology during interviews before laboratory practices.

Assessment			
Methodologies	Competencies	Description	Qualification
Laboratory practice	A2 A8 A20 B1 B2 B7 C3 C1	Competencies assessed: A3, A4, A5, A6, A8, A13, A20. B1, B2, B6, B7, C1, C3, C6, C8, C9	30
Multiple-choice questions	A1 A2 A3 A4 A8 A20 B1 B2 C5	Final written test. Competencies assessed: A3, A4, A5, A6, A8, A13, A20. B1, B2, B6	70

Assessment comments

Para o alumnado con recoñecemento de dedicación a tempo parcial e dispensa académica de exención de asistencia, a realización das prácticas de laboratorio será facilitada dentro da flexibilidade que permitan os horarios de coordinación e os recursos materiais e humanos.
O alumnado a tempo parcial será evaluado únicamente mediante a proba mixta que en su caso incluirá cuestións sobre as prácticas que computarán con un 10% na nota final da proba mixta.

Sources of information	
Basic	- S. M. Colegate y R. J. Molyneux (1993). Bioactive Natural Products: Detection, Isolation and Structural Determination. CRC Press, Boca Raton - H. Dugas y C. Penney (1996). Bioorganic Chemistry, a Chemical Approach to Enzyme Action. Springer-Verlag - K. Faber (2004). Biotransformations in Organic Chemistry. Springer-Verlag - Varios Autores (1999). Molecular Catenanes, Rotaxanes and Knots.. Wiley-VCH, Weinheim - Varios Autores (2000). Molecular Self-Assembly, Organic versus Inorganic Approaches.. Springer-Verlag - R. J. P. Cannell (1998). Natural Products Isolation. Ed. Human Press, New Jersey - Schneider, H. J., Yatsimirsky (2000). Principles and Methods in Supramolecular Chemistry. . Wiley, Chichester - P. Gil Ruiz (2002). Productos Naturales. Ed. Universidad Pública de Navarra, Pamplona - Steed, J. W., Atwood, J. L (2000). Supramolecular Chemistry.. Wiley, Chichester - Beer, P. D., Gale, P. A., Smith, D. K (1999). Supramolecular Chemistry. . Oxford University Press, Oxford - R. B. Silverman (2000). The Organic Chemistry of Enzyme-Catalyzed Reactions. . Academic Press
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Elucidation of Reaction Mechanisms/610500013 Organic Reactivity and Organometallic Chemistry/610500020 Green Chemistry/610500021
Subjects that continue the syllabus
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.