Teaching Guide				
Identifying Data				2022/23
Subject (*)	Supramolecular Chemistry		Code	610G04027
Study programme	Grao en Nanociencia e Nanotecnoloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Third	Obligatory	6
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química			
Coordinador	Brandariz Lendoiro, Maria Isabel	E-mail	i.brandariz@udc.es	
Lecturers	Brandariz Lendoiro, Maria Isabel Brea Fernández, Roberto Javier Criado Fernández, Alejandro Esteban Gomez, David Mosquera Mosquera, Jesús	E-mail	i.brandariz@udc.es roberto.brea@udc.es a.criado@udc.es david.esteban@udc.es j.mosquera1@udc.es	
Web	campusvirtual.udc.es			
General description	This course is an introduction to supramolecular chemistry and is divided into three fundamental blocks: first, the intermolecular forces that are responsible for the formation of supramolecular structures are studied, to then delve into molecular recognition, classical molecular receptors and metal-organic assembly, to finish studying in the last part, biomimetic supramolecular systems			

Study programme competences	
Code	Study programme competences
A1	CE1 - Comprender los conceptos, principios, teorías y hechos fundamentales relacionados con la Nanociencia y Nanotecnología.
A3	CE3 - Reconocer y analizar problemas físicos, químicos, matemáticos, biológicos en el ámbito de la Nanociencia y Nanotecnología, así como plantear respuestas o trabajos adecuados para su resolución, incluyendo el uso de fuentes bibliográficas.
A4	CE4 - Desarrollar trabajos de síntesis y preparación, caracterización y estudio de las propiedades de materiales en la nanoescala.
A5	CE5 - Conocer los rasgos estructurales de los nanomateriales, incluyendo las principales técnicas para su identificación y caracterización
B2	CB2 - Que los estudiantes sepan aplicar sus conocimientos a su trabajo o vocación de una forma profesional y posean las competencias que suelen demostrarse por medio de la elaboración y defensa de argumentos y la resolución de problemas dentro de su área de estudio
B4	CB4 - Que los estudiantes puedan transmitir información, ideas, problemas y soluciones a un público tanto especializado como no especializado
B5	CB5 - Que los estudiantes hayan desarrollado aquellas habilidades de aprendizaje necesarias para emprender estudios posteriores con un alto grado de autonomía
B8	CG3 - Aplicar un pensamiento crítico, lógico y creativo.
B9	CG4 - Trabajar de forma autónoma con iniciativa.
B11	CG6 - Comportarse con ética y responsabilidad social como ciudadano/a y como profesional.
C2	CT2 - Dominar la expresión y la comprensión de forma oral y escrita de un idioma extranjero
C5	CT5 - Entender la importancia de la cultura emprendedora y conocer los medios al alcance de las personas emprendedoras
C8	CT8 - Valorar la importancia que tiene la investigación, la innovación y el desarrollo tecnológico en el avance socioeconómico y cultural de la sociedad
C9	CT9 - Tener la capacidad de gestionar tiempos y recursos: desarrollar planes, priorizar actividades, identificar las críticas, establecer plazos y cumplirlos

Learning outcomes	
Learning outcomes	Study programme competences

Acquire basic knowledge related to Supramolecular Chemistry.	A1 A3 A4 A5		
Understand the relationship between the structure of chemical compounds and the formation of supramolecules through molecular recognition and self-assembly processes.		B2 B4 B5	
Interpret data from experimental observations and use of the various experimental techniques used in their characterization.		B8 B9 B11	C2 C5 C8 C9
Understand Supramolecular Chemistry as a tool for the construction of complex systems from perfectly defined units and their application in different areas of research.		B8 B9 B11	C2 C5 C8 C9

Contents	
Topic	**Sub-topic**
Intermolecular forces	Interactions involving ions, polar and polarizable molecules, Van der Waals forces. Hydrogen bonding, hydrophobic and hydrophilic interactions, colloids.
Synthetic supramolecular systems	Molecular recognition, classical molecular receptors, molecular self-assembly, molecular vessels, metal-organic assemblage
Biomimetic supramolecular systems	Combinatorial dynamics, Supramolecular chemistry in biological systems, Supramolecular polymers, Molecular motors, tubular structures, systems with response to external stimuli.
Lab experiments	Laboratory expLaboratory experiments to illustrate the formation of supramolecular structures and their characterization with different experimental methods and techniques

Planning				
Methodologies / tests	**Competencies**	**Ordinary class hours**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A1 A3 A4 A5	28	50	78
Seminar	B2 B4 B5 B8 B9	8	32	40
Laboratory practice	B9 B11 C2 C5 C8 C9	15	12	27
Mixed objective/subjective test	A1 A3 A4 A5 B2 B4 B5 B8 B9 B11 C2 C5 C8 C9	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 fundamental concepts and theories of the subject are explained
Seminar	Problems, questions and doubts related to the theoretical contents are solved.
Laboratory practice	It consists of two stages: Carrying out the assigned experiment in the laboratory Preparation of the internship report in which the results are described and the data obtained is analyzed.

Mixed objective/subjective test	It will consist of problems similar to those solved in the seminars and questions related to the theoretical content.

Personalized attention	
Methodologies	**Description**
Laboratory practice Seminar	Attendance at tutorials is recommended to resolve any questions that may arise both in solving problems, as well as for the preparation of the laboratory practice or for questions related to the master classes.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Mixed objective/subjective test	A1 A3 A4 A5 B2 B4 B5 B8 B9 B11 C2 C5 C8 C9	Written test to answer theoretical questions and solve exercises related to the contents of the lectures, seminars and practices.	70
Laboratory practice	B9 B11 C2 C5 C8 C9	In the evaluation of this activity, the laboratory work and the Results Report are taken into account.	20
Seminar	B2 B4 B5 B8 B9	The work done by the student in the seminars will be taken into account.	10

Assessment comments
-Attendance to the practices and the delivery of the Report, are essential requirements to pass the subject -To pass the subject, it will be necessary to obtain a grade of no less than 4.5 out of 10 in the mixed test and to achieve, adding the grades of all the activities, a minimum grade of 5.0. -If the minimum grade in the final mixed test has not been reached, the subject will appear as failed, even if the average of the grades obtained in the different methodologies is higher than 5 (out of a maximum of 10), in which case the final grade awarded will be from 4.5. -The registration qualification is granted preferably at the first opportunity. -In the second opportunity, the mixed test will be repeated and the qualification of the other activities will be maintained. -The qualification of not presented will be granted to those who do not appear for the mixed test and for the laboratory practice.-Students with recognition of part-time dedication and academic waiver of attendance exemption who cannot attend the seminars, may be assigned different works/problems throughout the course to be exposed during tutoring hours.

Sources of information	
Basic	- J. W. Steed, J. L. Atwood (2009). Supramolecular Chemistry 2nd Ed. Wiley and Sons - P. A. Gale, J. W. Steed (2012). Supramolecular Chemistry: From molecules to nanomaterials. Wiley and Sons Ltd. (Vol.1 - 2) - Jacob N. Israelachvili (2011). Intermolecular and Surface Forces 3ª ed.. Elsevier - Atkins, P. W. (2006). Physical Chemistry. Oxford ; New York : Oxford University Press,
Complementary	- BERRY R. S., RICE S. A., ROSS J. (2000). Physical Chemistry. 2ª ed.. Oxford University Press, New York - Anslyn, E. V., Dougherty D.A. (2006). Modern Physical Organic Chemistry. University Science Books - Bockris J.O.M., Reddy A K.N. (1998). Modern Electrochemistry 1. Ionics. 2nd ed.. Plenum Press, New York - Steed J. W., Atwood J.L. (2009). Supramolecular Chemistry 2ª ed.. Wiley UK

Recommendations
Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously
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.