Teaching Guide				
Identifying Data				2017/18
Subject (*)	Challenges and Perspectives in Solid State Chemistry		Code	610509124
Study programme	Mestrado Universitario en Investigación Química e Química Industrial (Plan 2017)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	Yearly	First	Optativa	3
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química			
Coordinador	Castro Garcia, Socorro	E-mail	socorro.castro.garcia@udc.es	
Lecturers	Castro Garcia, Socorro	E-mail	socorro.castro.garcia@udc.es	
Web				
General description	This subject aims to provide an overview of Solid State Chemistry and Materials, relating the rest of the subjects of this module to each other, and contextualizing the most important aspects of them. He will also put in context and relate the Solid State Chemistry and Materials with the other disciplines with which he interacts, since his study only makes sense in an interdisciplinary field, understanding that its raison d'être is the understanding and development of materials With applications in fields as varied as engineering, medicine, pharmacy, energy, computing, environment, quality control, etc.			

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.
A3	Innovate in the methods of synthesis and chemical analysis related to the different areas of chemistry
A4	Apply materials and biomolecules in innovative fields of industry and chemical engineering.
A5	Properly assess risks and environmental and socioeconomic impacts associated with special chemicals
A6	Design processes involving the treatment or disposal of hazardous chemicals
A7	Operate with advanced instrumentation for chemical analysis and structural determination.
A8	Analyze and use the data obtained independently in complex laboratory experiments and relating them with the chemical, physical or biological appropriate techniques, including the use of primary literature sources
A9	Promote innovation and entrepreneurship in the chemical industry and in research.
B1	Possess knowledge and understanding to provide a basis or opportunity for originality in developing and / or applying ideas, often within a research context
B2	Students should apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
B3	Students should be able to integrate knowledge and handle complexity, and formulate judgments based on information that was incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
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.
B6	Innovate in the different areas of chemistry, demonstrating initiative and entrepreneurship
B7	Identify information from scientific literature by using appropriate channels and integrate such information to raise and contextualize a research topic
B8	Evaluate responsibility in the management of information and knowledge in the field of Industrial Chemistry and Chemical Research
B9	Demonstrate ability to analyze, describe, organize, plan and manage projects
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.
B12	Being able to work in a team and adapt to multidisciplinary teams.
C1	CT1 - Elaborar, escribir e defender publicamente informes de carácter científico e técnico

C2	CT2 - Traballar en equipo e adaptarse a equipos multidisciplinares.
C3	CT3 - Traballar con autonomía e eficiencia na práctica diaria da investigación ou da actividade profesional.
C4	CT4 - Apreciar o valor da calidade e mellora continua, actuando con rigor, responsabilidade e ética profesional.

Learning outcomes			
Learning outcomes	Study programme competences		
The student will gain a panoramic of the Solid State Chemistry, its main areas of activity, achievements, limitations, goals and future perspectives. The student will know the main search strategies, design and development of new crystalline solids and advanced materials. The student will understand the interrelation composition-structure-microstructure-bond-properties. The student will get an overview of the new trends in synthetic methodologies, characterization and reactivity of the solids.	AC1 AC2 AC3 AC4 AC5 AC6 AC7 AC8 AC9	BC1 BC2 BC3 BC4 BC5 BC6 BC7 BC8 BC9 BC10 BC11 BC12	CC1 CC2 CC3 CC4

Contents	
Topic	Sub-topic
Unit I	? Introduction. Trends in Solid State Chemistry. ? Solid State Chemistry vs. Materials Science. ? Classification of Materials. ? Challenges in Materials Science. ? Types of materials, in the context of the current solid state perspectives.
Unit II	? Challenges in the field of material synthesis. ? Challenges in the field of material characterization.
Unit III	? Strategies to develop new materials from the perspective of Solid State Chemistry: Materials for Energy, Nanomaterials, Hybrid Materials and Metal-Organic Frameworks, Biomaterials, Materials & Art, etc.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A4 A3 A9 B5	12	0	12
Seminar	A4 A3 A7 B5	7	0	7
Supervised projects	B4 B5 C4 C3	2	0	2
Problem solving	A1 A2 A4 A3 A5 A6 A8 B1 B2 B3 B4 B5 B6 B8 B9 B10 B12 C1 C2 C3 C4	0	18	18
Document analysis	A9 B5 B7 B11	0	20	20
Objective test	A4 A3 A7 A9 B1 B4 B5	1	15	16
Personalized attention		0	0	0
(*)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	Interactive lectures by the teacher, with active participation of the students.
Seminar	Seminars with master's or guest professors, from other institutions, as well as with experts in the field. They will be interactive sessions.
Supervised projects	Individual or small group tutoring.
Problem solving	Solution to problems or development of short projects, proposed by the teacher, or by the student himself (if deemed appropriate).
Document analysis	Personal study based on the different sources of information.
Objective test	One or several tests for the verification of the acquisition of knowledge and acquisition of the skills and attitudes proposed for this subject.

Personalized attention	
Methodologies	**Description**
Problem solving Objective test	Individual or group tutoring.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Seminar	A4 A3 A7 B5	LECTURES, SEMINARS, PROBLEM SOLVING: compute together (45% of the overall rating)	0
Guest lecture / keynote speech	A4 A3 A9 B5	LECTURES, SEMINARS, PROBLEM SOLVING: compute together (45% of the overall rating)	0
Problem solving	A1 A2 A4 A3 A5 A6 A8 B1 B2 B3 B4 B5 B6 B8 B9 B10 B12 C1 C2 C3 C4	LECTURES, SEMINARS, PROBLEM SOLVING: compute together (45% of the overall rating)	45
Objective test	A4 A3 A7 A9 B1 B4 B5	55% of the overall rating	55

Assessment comments
The evaluation of this subject will be done through continuous assessment and the completion of a final exam, with access to the exam being subject to participation in at least 80% of the compulsory teaching activities (theoretical classes, seminars and tutorials). The teacher will verify the attendance to the classes according to the system of control officially established in the Center/University.Absences must be documented.Excused absences will count as attendance to teaching activities in order to attend the exam.

Sources of information	
Basic	Básica (manuales de referencia).- A.R. West: "Solid State Chemistry and its Applications". Wiley, 2 ed., 2014. - L.E. Smart, E.A. Moore: "Solid State Chemistry: An Introduction". CRC Press, 4 ed., 2012.Complementaria.Revistas periódicas de máximo impacto dos ámbitos de ?Estado Sólido? e ?Materiais? accesibles a través das bibliotecas universitarias (por exemplo Nature Materials, Advanced Materials, Progress in Solid State Chemistry, Chemistry of Materials, etc)Además, recomendaranse para cada tema textos complementarios (artículos, páxinas web, textos específicos) no momento de impartición.
Complementary	

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.