



## IDENTIFYING DATA

### Chemistry of Materials

Subject	Chemistry of Materials			
Code	V11G201V01402			
Study programme	Grado en Química			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	4th	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Pérez Lourido, Paulo Antonio			
Lecturers	Pérez Lourido, Paulo Antonio Puértolas Lacambra, Begoña Valencia Matarranz, Laura María			
E-mail	paulo@uvigo.es			
Web				
General description	Structure, properties and application of the different types of materials. English Friendly Subject: International students may request from teachers: a) materials and bibliographic references in english, b) tutoring sessions in english, c) exams and assessments in english.			

## Training and Learning Results

Code	
A2	Students have demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study
A3	Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues
B1	Ability for autonomous learning
B3	Ability to manage information
B4	Ability for analysis and synthesis
C16	Know the relationship between macroscopic properties and properties of individual atoms and molecules, including macromolecules (natural and synthetic), polymers, colloids, crystals and other materials
C24	Know the properties and applications of materials
D3	Ability to communicate in both oral and written form in Spanish and / or Galician and / or English

## Expected results from this subject

Expected results from this subject	Training and Learning Results		
Recognise the differences between the plastic and elastic deformation	B1 B3 B4	C16 C24	D3
Differentiate between electrical and ionic conductivity. Distinguish the intrinsic semiconductors of the *extrínsecos.	B1 B3 B4	C16 C24	D3
Distinguish hard magnetic materials and soft from his cycle of *histérisis.	B1 B3 B4	C16 C24	D3
Describe the optical properties of the metals and no metals	B1 B3 B4	C16 C24	D3
Explain the thermal properties more important of the materials.	B1 B3 B4	C16 C24	D3

Analyse and describe the characteristics of the alloys in function of his diagrams of phases.	A2 A3	B1 B3 B4	C16 C24	D3
Describe the properties of the different ceramic materials, polymers and compound.	A2 A3	B1 B3 B4	C16 C24	D3
Tackle the processes and basic technicians for the obtaining and characterisation of (*nano)material.	A2 A3	B1 B3 B4	C16 C24	D3

## Contents

Topic	
Subject 1. Introduction	Historical perspective of the development of the materials. Why study the materials? Classification of the materials. Need of new materials.
Subject 2. Properties of the materials	Mechanical properties, electrical, magnetic, optical and thermal of the materials.
Subject 3. Metallic materials and alloys, polymeric and ceramic materials.	Characteristics, properties and applications of the metals, alloys (diagrams of phases), polymers and ceramic.
Subject 4. Compound materials	General characteristics. Classification. Materials reinforced.
Subject 5. New materials and Nanomaterials	Nanoscience and nanotechnology. Methods of preparation. Properties to nanoscale.
Subject 6. Characterisation of materials	Isotherms of adsorption and quimisorción to temperature programmed. Microscopy of vicinity and electronic. Fotoelectrónica Spectroscopy.

## Planning

	Class hours	Hours outside the classroom	Total hours
Seminars	12	45	57
Lecturing	24	45	69
Objective questions exam	2	10	12
Objective questions exam	2	10	12

\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

## Methodologies

	Description
Seminars	They will devote to the resolution of doubts and questions that arise in the development of each subject, to the resolution of problems and/or exposed exercises by the profes@r and to the presentation by part of the alumn@s of some report and/or work related with the matter.
Lecturing	The alumn@s will receive 24 hours of classes *expositivas in an only group, that will devote to the presentation of the fundamental appearances of each subject.

## Personalized assistance

### Methodologies Description

Seminars	The alumn@s will be able to consult *toto type of doubts related with the matter in the *tutorías.
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## Assessment

	Description	Qualification	Training and Learning Results			
Seminars	In addition to resolving practical exercises that allow to the alumn@s settle the knowledges on the subjects unrolled in the classes of theory, and to resolve all the exposed doubts, the classes of seminar will use also to carry out the continuous evaluation of the alumn@s. This process of continuous evaluation will make through the resolution of exercises and/or problems as well as by means of the realisation of reports and/or works that will be exposed by the alumn@s and that will be related with the contents of the matter. The evaluation of the Seminars of the subjects 1-3 *equivaldrá to 10% of the final note and the one of the subjects 4-6 to 25%.	35	A3	B1 B3 B4	C16 C24	D3
Objective questions exam	Along the cuatrimestre will make a proof that will cover the Subjects 1-3 and will suppose 40% of the final note.	40	A3	B1 B3 B4	C16 C24	D3
Objective questions exam	At the end of the *cuatrimestre will make a second proof that will cover the Subjects 4-6 and will suppose 25% of the final note.	25	A3	B1 B3 B4	C16 C24	D3

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## Other comments on the Evaluation

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Observations:

The participation of any of the proofs planned evaluation will involve the condition of presented and, therefore, the allocation of a qualification in the record of the matter. It will be necessary to surpass the two short proofs (obtain a minimum of 40% of the note in each one) to be able to take into account the other elements of evaluation.

Evaluation of July: The students that non surpass one or the two short proofs that make during the cuatrimestre, will have to present to the corresponding part in the announcement of July. This proof will substitute the results obtained in the tests/s short/s made along the cuatrimestre. The remaining elements of evaluation are not recoverable and the qualifications obtained will add to the one of the quoted proof as long as the qualification obtained was equal or upper to 4 on 10. In case to obtain a lower qualification, will be this the one who appear like final qualification of the matter.

If the student renounces to the continuous evaluation and opts by a global evaluation, each one of the short proofs will cost 50% of the final note. The students that non surpass one or the two short proofs that make during the cuatrimestre, will have to present to the corresponding part in the announcement of July.

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## Sources of information

### Basic Bibliography

Callister, W.D., Rethwisch, D.G., **Introducción a la Ciencia e Ingeniería de los Materiales**, Reverté (trad. 9<sup>ed</sup>),

Smart, L.E. Moore, E.A., **Solid State Chemistry. An introduction**, Taylor & Francis, 4<sup>ed</sup>,

West, A.R., **West, A.R.. Solid state chemistry and its applications**, John Wiley & Sons.,

Levine, I.N., **Fisicoquímica**, McGraw-Hill / Interamericana de España, S. A.,

Kirkland, A.I., Hutchison, J.L., **Nanocharacterisation**, RSC, Cambridge,

Singh, S. C, Hoboken J., **Nanomaterials**, John Wiley & Sons,

Vollath, D., **Nanomaterials : an introduction to synthesis, properties and application**, Wiley-VCH,

### Complementary Bibliography

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## Recommendations

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### Subjects that are recommended to be taken simultaneously

Nanochemistry/V11G201V01403

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### Subjects that it is recommended to have taken before

Physics: Physics 2/V11G201V01107

Physical Chemistry II: Surfaces and Colloids/V11G201V01208

Inorganic chemistry II/V11G201V01209

Inorganic Chemistry III: Coordination Chemistry/V11G201V01304

Inorganic Chemistry IV: Transition Metals and Solid State/V11G201V01309

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