Universida_{de}Vigo

Subject Guide 2020 / 2021

| IDENTIFYIN | G DATA | | |
|---------------|---|---------------------|---------------------------|
| Materials ch | nemistry | | |
| Subject | Materials | | |
| | chemistry | | |
| Code | V11G200V01702 | | |
| Study | (*)Grao en | | |
| programme | Química | | |
| Descriptors | ECIS Credits Choose | Year | Quadmester |
| | 6 Mandatory | / <u>4</u> th | Ist |
| leaching | Spanish | | |
| language | Galician | | |
| Department | Delaño Courte Courtes | | |
| Coordinator | Bolano Garcia, Sandra | | |
| Lecturers | Bolano Garcia, Sandra | | |
| Empil | | | |
| | nds@nnido.es | | |
| | Structure properties and application of the different hunge of met | oriala | |
| description | Subscripting properties and application of the different types of mati | endis. | |
| | | | |
| Comment | | | |
| Code | es | | |
| | trate knowledge and understanding of eccential factor encounts | inciploc and that | oc Characteristics of the |
| different | states of matter and the theories used to describe them | incipies and theori | |
| | trate knowledge and understanding of essential facts, concents, pr | inciples and theori | es: main techniques for |
| structur | al determination including spectroscopy | | cs. main cechniques ivi |
| C18 Demons | trate knowledge and understanding of essential facts concents pr | inciples and theori | es: principles of |
| electroc | hemistry | | |
| C19 Apply kr | nowledge and understanding to solve basic problems of quantitative | e and gualitative n | ature |
| C20 Evaluate | e, interpret and synthesize data and chemical information | | · ··· · |
| C23 Present | oral and written scientific material and scientific arguments to a sp | ecialized audience | 2 |
| D1 Commu | nicate orally and in writing in at least one of the official languages of | of the University | |
| D3 Learn in | dependently | - - | |
| D4 Search a | and manage information from different sources | | |
| D5 Use info | rmation and communication technologies and manage basic compu | uter tools | |
| D7 Apply th | eoretical knowledge in practice | | |
| D8 Teamwo | ork | | |
| D9 Work inc | dependently | | |
| D12 Plan and | d manage time properly | | |
| D13 Make de | ecisions | | |
| D14 Analyze | and synthesize information and draw conclusions | | |
| D15 Evaluate | e critically and constructively the environment and oneself | | |
| | , | | |
| Learning ou | tcomes | | |
| Expected res | ults from this subject | | Training and Learning |
| Analyse the c | haracteristics of metals and allows through essays of traction and c | ompression | |
| Analyse the t | indiactensites of metals and anoys through essays of traction dhu t | | C19 D1 |
| | | | C20 D9 |
| Differentiate | between electrical and ionic conductivity. Distinguish the intrinsic s | emiconductors of | C5 D1 |
| the extrinsic | between electrical and ionic conductivity. Distinguish the lift libre s | | C19 D7 |
| | | | C20 D9 |

Differentiate between the cooperative magnetism and the no cooperative.

D1 D9

C5 C19

C20

| Recognise hard magnetic materials and soft from his cycle of his | téresis. | C5 C19 C20 | D1 D9 |
|--|--|-------------------------------|---|
| Recognise the types of superconductivity and his relation with th | e nature of the material. | C5 C19 C20 | D1 D9 |
| Describe the optical properties of the metals and no metals. | | C5 C19 | D1 D9 |
| Describe the applications of the optical phenomena more importa | ant. | C5 C19 | D1 D9 |
| Explain the thermal properties more important of the materials. | | C5 C19 C20 | D1 D9 |
| Analyse and describe the characteristics of the alloys in function | of his diagrams of phases. | C5 C19 C20 | D1 D7 D9 D12 D13 D14 |
| Describe the properties of the different ceramic materials and po | lymers. | C5 C20 | D1 D7 D9 |
| Describe the general characteristics of the compound materials. | | C20 C23 | D1 D3 D4 D5 D8 D12 D14 D15 |
| Analyse the corrosion of metals and ceramic and the degradation | n of the polymers. | C18 | D1 D8 D14 |
| Justify and enter the need of new materials and nanomaterials. | | C20 C23 | D1 D3 D4 D5 D8 D12 D14 D15 |
| Describe the basic processes for the obtaining of nanomaterials. | | C5 C20 C23 | D1 D3 D4 D7 D8 D9 D13 D15 |
| Tackle the basic technicians of study of the surfaces of the mater | rials. | C8 C23 | D1 D3 D4 D5 D8 D12 D14 D15 |
| Contents | | | |
| Topic Subject 1. Introduction Historical perspective persp | pective of the development of t cure and properties. Classificati | the materials on of the ma | . Relation terials. Need of |

| Subject 2. Properties of the materials. | Mechanical properties. Electrical properties. Magnetic properties. Optical |
|---|---|
| | properties. Thermal properties. |
| Subject 3. Metallic materials and alloys. | Diagrams of phase. Thermal treatment of the metallic alloys. ferric Alloys. |
| | Steels. No-Ferric Alloys. Alloys with memory of form. |

| Subject 4. Ceramic materials. | Usual structures. Sillicates. Carbon. Imperfections. Glasses. Clays. Refractory. |
|---|---|
| Subject 5. Material polymers. | Structures of the polymers. Mechanical and thermomechanical characteristics. Thermoplastic and thermostable polymers. Applications and forming of the polymers. |
| Subject 6. Compound materials. | General characteristics. Classification. Materials reinforced with: particles, fibres and structural compounds. |
| Subject 7. Degradation of materials. | Metallic oxidation and passivation. Methods of protection against the corrosion. Methods of self-reparation. |
| Subject 8. New materials and nanomaterials. | Nanoscience and nanotechnology. Methods of preparation. Properties to nanoscale. |
| Subject 9. Characterisation of materials. | Electronic microscopy, fotoelectrónic spectroscopy. |

| Planning | | | |
|--|-----------------------------|------------------------------|-----------------------------|
| | Class hours | Hours outside the | Total hours |
| | | classroom | |
| Seminars | 13 | 32 | 45 |
| Lecturing | 26 | 45 | 71 |
| Problem and/or exercise solving | 4 | 30 | 34 |
| *The information in the planning table is fo | r guidance only and does no | ot take into account the het | erogeneity of the students. |

| Methodologies | |
|---------------|--|
| | Description |
| Seminars | They will devote to the resolution of doubts or questions that arise in the development of each subject, to the exhibition by part of the students of subjects related with the matter, as well as to the resolution of exercises and exposed problems by the professor. |
| Lecturing | The students will receive 26 hours of magistral classes in an only group, that will devote to the presentation of the fundamental appearances of each subject. The platform of "teledocencia" will use to provide the supplementary material related with the matter. |

| Personalized assistance | | |
|-------------------------|--|--|
| Methodolog | ies Description | |
| Seminars | During all the educational period the students will be able to consult all type of doubts related with the matter in the tutorial hours. | |

| Assessmen | t | | | |
|--|--|---------------|-------------------------------|-------------------------------|
| | Description | Qualification | Traini Lea Res | ng and rning sults |
| Seminars | In addition to resolving practical exercises that allow to the students 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 to continuous evaluation of the students. | 40 | C5 C8 C19 C20 C23 | D1 D3 D4 D5 D7 |
| | This process of continous evaluation will make through the resolution of exercises and/or problems related with the contents of the matter, as well as the resolution of exposed short questions by the professor/to that the students will have to deliver for his evaluation. | | | D8 D9 D12 D13 D14 |
| | students of subjects related with the matter. | | | 012 |
| Problem and/or exercise solving | To the long of the quadrimester will make two short proofs for the evaluation of the competitions purchased in the matter. The first of them will cover the subjects 1-5 and will suppose 36% of the final note. The second will cover the subjects 6-9 and will suppose 24% of the final note. To surpass the matter is necessary to reach a minimum of 40% in each one of the short proofs. | 60 | C5 C8 C18 C19 C20 | D1 D7 D12 D13 |

Other comments on the Evaluation

Observations: The participation in any of the proofs of 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 grade of each one) to be able to take into account the other elements of evaluation.

Evaluation of July: The students that do not pass one or the two short proofs done during the quadrimester will have to

present those proofs. This proof substitute to the results obtained in the/s short proof/s done to the long of the quadrimester. The final grade could be he highest obtained when comparing the final examination grade and the weighted examination note with the continuous evaluation (a minumum of 50% of the grade of each part is necessary).

Sources of information Basic Bibliography

Complementary Bibliography

Callister, W.D., Rethwisch, D.G., Materials Science and Engineering, Wiley,

Callister, W.D., Rethwisch, D.G., Introducción a la Ciencia e Ingeniería de los Materiales, Reverté (trad. 9ºed), Kirkland, A.I., Hutchison, J.L., Nanocharacterisation, RSC, Cambridge,

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

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

Smart, L.E. Moore, E.A., Solid State Chemistry. An introduction, Taylor & amp; Francis, 4ªed,

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

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

Recommendations

Subjects that are recommended to be taken simultaneously Inorganic chemistry III/V11G200V01703

Subjects that it is recommended to have taken before

Physical chemistry III/V11G200V01603

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===

Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes an extraordinary planning that will be activated when the administrations and the institution itself determine it, considering safety, health and responsibility criteria both in distance and blended learning. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and teachers through the standardized tool.

=== ADAPTATION OF THE METHODOLOGIES ===

Theoretical and seminar teaching will be provided through the remote campus if it is necessary. Tutoring will be done through e-mail, and remote campus.

=== ADAPTATION OF THE TESTS ===

In case of not being able to do the short proofs or the July exam in person, the quizzes done in the seminars during the course will have a value of 70% (previous weight 40%) and the short proofs or July exam will have a value of 30% (previous weight 60%).