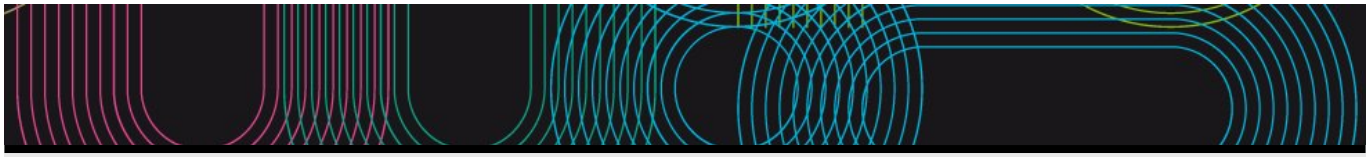

IDENTIFYING DATA				
Chemistry: Chemistry 2				
Subject	Chemistry: Chemistry 2			
Code	V11G200V01204			
Study programme	(*)Grao en Química			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Losada Barreiro, Sonia			
Lecturers	García Domínguez, Patricia Losada Barreiro, Sonia Rodríguez Arguelles, María Carmen			
E-mail	sonia@uvigo.es			
Web	http://faitic.uvigo.es			
General description	Chemistry II pretends to provide to students the basis for the understanding of disciplines more specific, that will give in future courses.			

Competencies	
Code	
C1	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: Major aspects of chemical terminology, nomenclature, units and unit conversions.
C2	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: types of chemical reactions and its main characteristics
C5	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: Characteristics of the different states of matter and the theories used to describe them
C9	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: characteristic properties of the elements and their compounds, including group relationships and variations in the periodic table
C12	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: structural features of chemical elements and their compounds, including stereochemistry
C19	Apply knowledge and understanding to solve basic problems of quantitative and qualitative nature
D1	Communicate orally and in writing in at least one of the official languages of the University
D3	Learn independently
D4	Search and manage information from different sources
D6	Use mathematics, including error analysis, estimates of orders of magnitude, correct use of units and data representations
D7	Apply theoretical knowledge in practice
D8	Teamwork
D9	Work independently
D12	Plan and manage time properly
D13	Make decisions
D14	Analyze and synthesize information and draw conclusions
D15	Evaluate critically and constructively the environment and oneself

Learning outcomes	
Expected results from this subject	Training and Learning Results

Interpret the functions of radial distribution and the angular representations of the s, p, d and f orbitals. Describe the configuration in the fundamental state of atoms and ions. Justify the variations of different atomic parameters along the Periodic Table. Interpret the electronegativity and the polarizability of an atom.	C5 C9 C19	D1 D3 D4 D6 D7 D8 D9 D12 D13 D14 D15
Recognize the atomic orbitals involved in a bonding. Build diagrams of OM for diatomic molecules and deduce properties of the bonding. Define overlap integral. Apply the method of hybridization to explain the bonding in simple molecules.	C5 C19	D1 D3 D4 D7 D8 D9 D12 D13 D14
Describe the state of aggregation of the elements and his behaviour in front of oxygen and water. Describe the natural resources of the elements and some methods of obtaining.	C5 C9	D1 D3 D4 D7 D8 D9 D12 D14
Use the models of bonding to explain the structure of the main functional groups. Relate its structure with its macroscopic properties.	C1 C9	D1 D3 D4 D7 D8 D9 D12 D14
Identify the acidic protons in an Brönsted acid. Classify the Brönsted acids. Predict the acidity and basicity of organic compounds. Identify acids and bases of Lewis and types of acid-base reactions. Identify acids and bases as hard or soft and explain its interaction.	C1 C2 C19	D1 D3 D4 D7 D8 D9 D12 D14
Represent the three-dimensional structure of organic molecules. Apply the principles of stereochemistry. Determine the absolute configuration. Apply the nomenclatures R/S and Z/Y.	C1 C12	
Explain the bonding solids. Relate structure and properties in amorphous solids. Describe the supercondutivity. Interpret one model structure. Predict the coordination number in function of the relation of ionic radii. Use the cycle of Born-Haber to determine the lattice enthalpy.	C5 C19	D1 D3 D4 D7 D8 D9 D12 D14
Define the standard potentials of reduction. Calculate the variation of energy of Gibbs in a redox reaction. Explain an electrochemical cell. Predict the products and its quantities in a electrolysis.	C1 C19	D1 D3 D4 D7 D8 D9 D12 D14

Characterize the types of radiation in a radioactive disintegration. Write nuclear reactions. Calculate the nuclear binding energy and the half life of an isotope. Describe the reactions in nuclear chain. Enumerate examples of the use of radioisotopes.	C1 C19	D1 D3 D4 D7 D8 D9 D12 D14

Contents	
Topic	
Subject 1: Structure of matter	Structure of the hydrogenic atoms. Polyelectronic atoms. Atomic parameters. Lanthanide contraction. Electronegativity. Polarizability.
Subject 2: Chemical bonding	Theory of OM. Types of orbital: sigma, pi, delta. Diagram of energies for diatomic homo- and heteronuclear molecules.
Subject 3: Solids	Structure of the simple solids. Structure of the metals. Alloys. Metallic bonding. Semicondutors. Ionic solids. Energetic aspects.
Subject 4: Redox properties of the main group elements	Oxidants and reductants. Nerst Equation.
Subject 5: Electrochemisty	Concentration cells. Batteries. Fuell cells. Electrolysis. Commercial electrolytic processes. Corrosion.
Subject 6: Acid-Base properties of the main group elements	Brönsted acids and bases. Lewis acids and bases.
Subject 7: Nuclear chemistry	Nuclear reactions. Radioactive disintegration. Artificial transmutations. Nuclear fission. Nuclear fusion. Nuclear radiation. Applications of the radioactivity.
Subject 8: Organic Compounds and functional groups	Structure and geometry. Approach and nomenclature of organic compounds. Physical properties.
Subject 9: Isomery	Geometrical isomery. Conformational stereoisomery. Configurational stereoisomery.

Planning			
	Class hours	Hours outside the classroom	Total hours
Master Session	26	38	64
Seminars	26	40	66
Long answer tests and development	3	11	14
Short answer tests	2	4	6
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Master Session	In these sessions, we present the general aspects of the program
Seminars	Each week we employe two hours to the resolution of some problems or exercises proposed related with the matter. These exercises will be delivered previously to the student through the platform Tem@ expecting that the student work them. In these sessions, we can collect questions or short problems to control the progress of the students.

Personalized attention	
Methodologies	**Description**
Seminars	During all the educational period the students will be able to consult all type of doubts related with the matter. These queries will attend so much in schedules of tutorials as of seminars.

Assessment			
	Description	Qualification	Training and Learning Results

Seminars	The attitude and participation of the student will be valued. We also may collect questions or problems as tracking student progress. The punctuation only will be considered if the student reaches a qualification equal or upper than 5 points on 10.	15	C1 C2 C5 C9 C12 C19	D1 D3 D4 D6 D7 D8 D9 D12 D13 D14 D15
Long answer tests and development	Test for evaluation of the competitions purchased in the matter. The punctuation only will be considered if the student reaches a qualification equal or upper than 5 points on 10 in the short answer test. Students who have not passed the short answer test, will need to pass the examination of the whole course.	40	C1 C2 C5 C9 C12 C19	
Short answer tests	The students will have a short answer text along the course on the matter explained in the sessions and seminars. If students pass this exam (a qualification equal or upper than 5 points on 10), they only will need to pass the examination corresponding to the rest of subjects in the long answer test.	45	C1 C2 C5 C9 C12 C19	

Other comments on the Evaluation

Students must attend all test performed along the course. The participation in the evaluation activities throughout the semester or in some of the assessment test involve the condition of presented and therefore the student will be grade.

The final note of the subject will be:
- that note obtained by the continuous evaluation (15% seminars + 45% short answer test + 40% long answer test) for those students that have reached a punctuation equal or upper than 5 points on 10 in the short answer test. The students must attend both tests (short and long answer tests).
- that note obtained in the long answer test by the examination of the whole course for those students that have not reached an punctuation equal or upper than 5 points on 10 in the short answer test.
Assessment in July: it is governed by the above.

Sources of information

Basic Bibliography

Chang, R. and Goldsby, K. A., **Química**, 12ª, McGrawHill: Mexico, 2017

Petrucci, R.A. et al., **Química general: Principios y aplicaciones modernas.**, 11ª, Madrid: Pearson Educación, D.L., 2017

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Brown, T.L.; Lemay, H.E.; Bursten, B.E.; Murphy, C.J.; Woodward, P.M., **Química. La ciencia central.**, 12ª, Pearson: Naucalpan (Mejico), 2014

Jr Wade, L.G., **Química Orgánica.**, 7ª, Pearson-Educación de México, 2012

Quiñoá, E. e Riguera, R., **Nomenclatura y representación de los compuestos orgánicos.**, 2ª, McGraw Hill Interamericana, 2005

Peterson, W. R., **Nomenclatura de las sustancias químicas.**, 4ª, Barcelona: Reverté, D.L., 2016

Complementary Bibliography

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Tan, J. and Chan K.S., **Understanding Advanced Physical Inorganic Chemistry.**, World Scientific Publishing, Singapore, 2017

Pfenning, B.W., **Principles of Inorganic Chemistry.**, 1ª, Wiley, 2015

Carey, F., **Química Orgánica.**, 9ª, McGraw Hill: Interamericana, 2014

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Recommendations

Subjects that continue the syllabus

Physical chemistry I/V11G200V01303
Inorganic chemistry I/V11G200V01404
Organic chemistry I/V11G200V01304

Subjects that are recommended to be taken simultaneously

Physics: Physics II/V11G200V01201

Geology: Geology/V11G200V01205
Mathematics: Mathematics II/V11G200V01203
Chemistry, physics and geology: Integrated laboratory II/V11G200V01202

Subjects that it is recommended to have taken before

Biology: Biology/V11G200V01101
Physics: Physics I/V11G200V01102
Mathematics: Mathematics I/V11G200V01104
Chemistry, physics and biology: Integrated laboratory I/V11G200V01103
Chemistry: Chemistry I/V11G200V01105