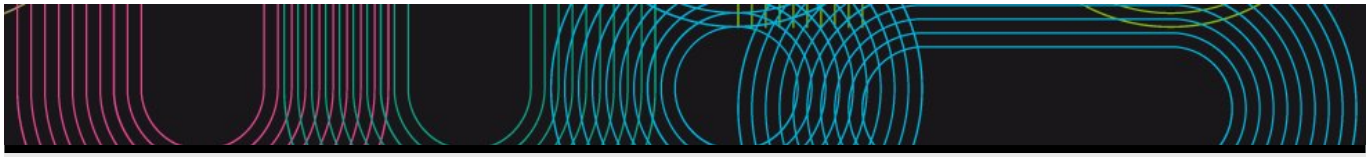

IDENTIFYING DATA				
Inorganic chemistry II				
Subject	Inorganic chemistry II			
Code	V11G200V01604			
Study programme	(*)Grao en Química			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Vázquez López, Ezequiel Manuel			
Lecturers	Carballo Rial, Rosa Vázquez López, Ezequiel Manuel			
E-mail	ezequiel@uvigo.es			
Web	http://faitic.uvigo.es			
General description	This matter presents the most relevant aspects of the Chemistry of the Transition Metals as well as an important class of derivatives known as coordination compounds.			

Competencies	
Code	
C2	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: types of chemical reactions and its main characteristics
C7	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: kinetics of change, including catalysis and reaction mechanisms
C8	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: main techniques for structural determination, including spectroscopy
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
C14	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories: relationship between macroscopic properties and properties of individual atoms and molecules, including macromolecules

Learning outcomes	
Expected results from this subject	Training and Learning Results
Classify ligands and coordination compounds, as well as recognize the presence of isomers.	C12
Define the global and steps thermodynamic stability constants of one complex and describe the chelate, macrocyclic and cryptate effects	C2 C14
Deduce the spectroscopic terms for stable electronic configurations of the transition metals in a coordination compound	C9
Construct and interpret a qualitative energy diagram of molecular orbitals in octahedral complexes	C12 C14
Interpret the electronic spectra of octahedral, tetrahedral and square planar complexes of transition metals and rationalize their magnetic behavior	C8 C14
Describe the different mechanisms of substitution and rationalize the various products obtained in substitution reactions in octahedral and square planar complex.	C7
Describe how you can get metals from their natural resources	C9
Being able to differentiate the behavior between the elements of the first transition series and the second and third.	C9
Predicting the reactivity of the metal oxides, halides and of those of the coordination compounds based on the bond and on the oxidation state of the metal.	C9

Rationalize the thermodynamic stability of coordination compounds, depending on the oxidation state of the metal and the type of ligand.	C9 C12 C14

Contents	
Topic	
Subject 1: Introduction to the Chemistry of the transition metals.	Physical properties. Electronic configuration. multielectronic systems Spectroscopic terms. Reactivity and properties
Subject 2: Coordination chemistry.	Coordination numbers and geometries. Type of ligands. Isomers in coordination chemistry. Nomenclature.
Subject 3: Bonding in the coordination compounds (I):	Crystal field theory. Weak and strong field complexes in octahedral complexes. Tetrahedral square-plane complexes.
Subject 4: Bonding in the coordination compounds (II):	Molecular orbital theory in octahedral complexes. The metal-ligand interaction.
Subject 5: Spectroscopical and magnetic properties in metal complexes.	Energy states. Selection rules. Charateristics of the electronic spectra, Magnetic behavior.
Subject 6: Thermodinamic properties of the coordination compounds.	Stability constants and and factors that afect tthem. Chelate, macrocycle and criptate effect.
Subject 7: Mechanisms of reaction in coordination compounds.	Substitution reactions of *sustitución in square-plane and octahedral complexes. Electronic transfe.
Subject 8: Chemistry of the transitional metals	Global aspects. Frost diagrams. General methods of obtention and purification of the metals.
Subject 9: Chemistry of the 3 and 5 groups metáls.	Extraction and uses. Oxidation states. Representative compounds of titanium: halides, oxides and mixed oxides. Coordination Compounds.
Subject 10: Chemistry of the 5 group metals.	Extraction and uses. Oxidation states. Representative compounds of vanadium: halides, oxides and oxoanions. Coordination Compounds.
Subject 11: Chemistry of the 6 group metals.	Extraction and uses. Oxidation states. Representative compounds of chromium: halides, oxides and oxoanions. Coordination Compounds.
Subject 12: Chemistry of the 7 group metals.	Extraction and uses. Oxidation states. Representative compounds of manganese: halides, oxides and oxoanions. Coordination Compounds. Bioinorganic chemistry of the manganese and technetium.
Subject 13: Chemistry of the 8 group metals.	Extraction and uses. Oxidation states. Representative compounds of iron: halides, oxides and mixture oxides. Coordination Compounds. Bioinorganic chemistry of iron.
Subject 14: Chemistry of the 9 group metals.	Extraction and uses. Oxidation states. Representative compounds of cobalt: halides, oxides and coordination compounds. Bioinorganic chemistry of cobalt.
Subject 15: Chemistry of the 10 group metals.	Extraction and uses. Oxidation states. Representative compounds of nickel: halides, oxides and coordination compounds. Bioinorganic chemistry of platinum.
Subject 16: Chemistry of the 11 group metals.	Extraction and uses. Oxidation states. Representative compounds of copper: halides, óxides and coordination compounds. Bioinorganic chemistry of copper and gold.

Subject 17: Chemistry of the 12 group metals.	Extraction and uses. Oxidation states. Representative compounds of zinc and mercury: halides, oxides and coordination compounds. Bioinorganic chemistry of the elements of the group.

Planning

	Class hours	Hours outside the classroom	Total hours
Seminars	26	26	52
Master Session	26	39	65
Short answer tests	2	2	4
Troubleshooting and / or exercises	0	21	21
Long answer tests and development	4	4	8

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

Methodologies

	Description
Seminars	Seminar classes will be devoted to the resolution of case studies related to the subject as well as the resolution of questions or issues that arise in the development of each topic. Beheld also hold seminars that address issues not taught in other courses but necessary for the progress of the course.
Master Session	The lectures will be devoted to presenting the fundamental aspects.

Personalized attention

Methodologies	Description
Master Session	Throughout the educational period students can consult any doubts on the matter tutorials or previous appointment.
Seminars	Throughout the educational period students can consult any doubts on the matter tutorials or previous appointment.

Assessment

	Description	Qualification	Training and Learning Results
Seminars	In the lectures they may ask students to solve simple issues that will have to deliver at that time and will serve for the evaluation. The score will be considered only if the test is long reaches a score of 3 or above on 10 points.	10	C2 C7 C8 C12 C14
Master Session	In the lectures they may ask students to solve simple issues that will have to deliver at that time and will serve for the evaluation. The score will be considered only if the test is long reaches a score of 3 or above on 10 points.	5	C2 C7 C8 C12
Short answer tests	There will be two short tests throughout the school period of 1-2 hours each. The score will be considered only if the test is long reaches a score greater than or equal to 3 points out of 10.	30	C2 C7 C8 C9 C12 C14
Troubleshooting and / or exercises	Throughout the course they ask students to do exercises to perform such work. The solutions must be submitted in a timely manner previously established. It is possible that the teacher ask the student to defend his response delivered before proceeding with the assessment. The score will be considered only if the test is long reaches a score greater than or equal to 3 points out of 10.	15	C2 C7 C8 C9 C12 C14
Long answer tests and development	There will be a test at the end of the semester in which students must resolve all issues related to the presented contents.	40	C2 C7 C8 C9 C12 C14

Other comments on the Evaluation

Attendance at lectures and seminars is mandatory. The competencies of the subject relating to the competencies of the degree (A1-A3, A5, A10, A12 and A20) will be assessed explicitly in classroom exercises and written tests. The transferable skills will be evaluated implicitly by the qualification of the exercises (B2, B3 and B4).
To pass the course the professor must have time and form of a minimum of 80% of the exercises proposed in the various activities and presences. It is also mandatory for the student to present all written tests planned to pass the course.
Will need a score greater than or equal to 30% of the total value in each of written tests (short and final) and the sum total of the qualifications of the deliverables to the final qualification note the rest of the elements of evaluation (exercises and short tests). Failure to achieve any of the minimum, in the act appear the result of the tests and weighted exercises in which qualified reached criterion.

A student who performs over 20% of the total planned work or take any of the tests will be graded in accordance with the current regulations and, therefore, may not be in the act of qualifying NOT PRESENTED.

Students who fail the course at the end of the semester will take a written test in the closing period of evaluation in the final month of July. This test will be worth 40% of the mark and replace the test results at the end of the semester. The qualification of the exercises (classroom activities) and short tests are not recoverable.

The final of the students, to be more than 7 points can be normalized so that the highest score can be up to 10 points.

Sources of information

Housecroft, C.E. e Sharpe, A.G., **Inorganic chemistry**, 3º Ed.,

Winter, Mark J., **D-block chemistry**, Oxford : Oxford University Press, 1994,

Housecroft, Catherine E., **The Heavier d-block metals : aspects of inorganic and coordination chemistry**, Oxford : Oxford University Press, 1999,

Atkins, Peter, **Inorganic Chemistry**, Oxford : Oxford University Press, 2010,

Housecroft, C.E. e Sharpe, A. G., **Inorganic chemistry**, 4º ed.,

Recommendations

Subjects that continue the syllabus

Materials chemistry/V11G200V01702
Inorganic chemistry III/V11G200V01703

Subjects that it is recommended to have taken before

Chemistry: Chemistry I/V11G200V01105
Chemistry: Chemistry 2/V11G200V01204
Physical chemistry I/V11G200V01303
Physical chemistry II/V11G200V01403
Inorganic chemistry I/V11G200V01404