Teaching Guide				
Identifying Data				2016/17
Subject (*)	Química Inorgánica 3		Code	610G01023
Study programme	Grao en Química			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Third	Obligatoria	6
Language	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química Fundamental			
Coordinador	Platas Iglesias, Carlos	E-mail	carlos.platas.iglesias@udc.es	
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Web				
General description	?Inorganic Chemistry 3? is a compulsory subject in the 1st semester of the 3rd year of the Degree in Chemistry. This subject belongs to the module "Inorganic Chemistry" and is dedicated to the study of Coordination Compounds and Inorganic Solids, both from the standpoint of the structures and bonding, as the reactivity of the former. For the study of this subject is essential to have well-established skills of ?Inorganic Chemistry 1?, ?Inorganic Chemistry 2?, ?Physical Chemistry 1? and ?Physical Chemistry 2? (all of the 2nd year). ?Inorganic Chemistry 3? serves as the foundation for ?Inorganic Chemistry 4? (3rd year, 2nd semester), ?Advanced Inorganic Chemistry? and ?Materials Science? courses (both of the 4th year).			

Study programme competences	
Code	Study programme competences
A1	Ability to use chemistry terminology, nomenclature, conventions and units
A3	Knowledge of characteristics of the different states of matter and theories used to describe them
A4	Knowledge of main types of chemical reaction and characteristics of each
A5	Understanding of principles of thermodynamics and its applications in chemistry
A6	Knowledge of chemical elements and their compounds, synthesis, structure, properties and reactivity
A8	Knowledge of principles of quantum mechanics and atomic and molecular structure
A9	Knowledge of structural characteristics of chemical and stereochemical compounds, and basic methods of structural analysis and research
A10	Knowledge of chemical kinetics, catalysis and reaction mechanisms
A14	Ability to demonstrate knowledge and understanding of concepts, principles and theories in chemistry
A15	Ability to recognise and analyse new problems and develop solution strategies
A16	Ability to source, assess and apply technical bibliographical information and data relating to chemistry
A24	Ability to explain chemical processes and phenomena clearly and simply
A25	Ability to recognise and analyse link between chemistry and other disciplines, and presence of chemical processes in everyday life
B1	Learning to learn
B2	Effective problem solving
B3	Application of logical, critical, creative thinking
B4	Working independently on own initiative
B5	Teamwork and collaboration
B7	Effective workplace communication
C1	Ability to express oneself accurately in the official languages of Galicia (oral and in written)
C2	Oral and written proficiency in a foreign language
C6	Ability to assess critically the knowledge, technology and information available for problem solving
C7	Acceptance as a professional and as a citizen of importance of lifelong learning

C8	Understanding role of research, innovation and technology in socio-economic and cultural development

Learning outcomes			
Learning outcomes	Study programme competences		
To know the structure and the nature of chemical bonding in coordination compounds.	A1 A3 A6 A8 A9 A14 A15 A16 A24 A25	B1 B2 B3 B4 B5 B7	C1 C2 C6 C7 C8
To know the thermodynamic aspects related to the stability of coordination compounds.	A1 A5 A9 A14 A15 A16	B1 B2 B3 B4 B5 B7	C1 C2 C6 C7 C8
To know the most important reaction mechanisms for coordination compounds.	A1 A4 A9 A10 A14 A15 A16	B1 B2 B3 B4 B5 B7	C1 C2 C6 C7 C8
To know the structure of inorganic solids.	A1 A3 A6 A9 A14 A15 A16	B1 B2 B3 B4 B5 B7	C1 C2 C6 C7 C8
To know the microstructure of inorganic solids.	A1 A6 A9 A14 A15 A16 A24 A25	B1 B2 B3 B4 B5 B7	C1 C2 C6 C7 C8

To know the nature of chemical bonding in inorganic solids.	A1 A3 A5 A6 A8 A9 A14 A15 A16 A24 A25	B1 B2 B3 B4 B5 B7	C1 C2 C6 C7 C8

Contents	
Topic	**Sub-topic**
1.- Introduction to Coordination Chemistry.	Introduction.
2.- Bonding in coordination compounds.	- Valence bond theory. - Crystal field theory. - Molecular orbital theory.
3.- Thermodynamic stability of coordination compounds.	- Introduction: stability/instability vs. inertia/lability. - Stability constans. - Factors that affect the stability of complexes.
4.- Reaction mechanisms of coordination compounds.	- Ligand substitution reactions. - Redox reactions.
5.- Introduction to Solid State Chemistry.	Introduction.
6.- Ideal solids: Structural aspects and bonding.	- Structures of solids. - Bonding in solids: ionic model, band model.
7.- Real solids: defects in solids, examples of inorganic solids with relevant properties.	- Defects in solids. - Examples of solids with important properties.

Planning				
Methodologies / tests	**Competencies**	**Ordinary class hours**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A1 A25 B7 C8 C2	28	42	70
Workshop	A5 A6 A8 A9 A10 A14 A16 B5 C2	7	21	28
Problem solving	A3 A4 A15 A24 B1 B2 B3 B4 C1 C2 C6 C7	7	24.5	31.5
Mixed objective/subjective test	A1 A3 B2 B3 B4 B7 C1 C2	4	15.5	19.5
Personalized attention		1	0	1
(*)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	Lectures to introduce the most relevant issues related to the contents of the course, highlighting the most important aspects.
Workshop	Practical activities to aid the understanding of the more difficult aspects of the course.
Problem solving	Classes oriented to solve problems and exercises previously proposed to the students, so that they can work on them in advance.

Mixed objective/subjective test	Final written exam that will take place at the end of the course with the aim to evaluate the global knowledge, understanding and skills acquired by each student.

Personalized attention	
Methodologies	**Description**
Guest lecture / keynote speech Problem solving Workshop	The didactic methodology proposed for this course relies on the individual work of the student, which is the main responsible of the educational process. Nevertheless, it is of crucial importance to achieve a close interaction between the student and the instructor, which will guide the student throughout the process. Thanks to this interaction and the different assessment activities planned for the course the instructor will determine the extent to which the student has achieved the objectives of each topic and provide appropriate advice individually. This guidance will take place at the tutoring hours of the lecturer (the timetable will be indicated at the beginning of the course) or at any other moment agreed by the student and the instructor. Students can ask for additional tutoring sessions if required. Those students having a part-time dedication to the course, and thus waiver of assistance to the on-site academic activities according to the regulations of UDC, follow different dynamics that require additional personalized attention. The waiver applied to each student is fixed after a personal interview with the instructor on the basis of the student's personal circumstances. The tutoring sessions are scheduled in this interview upon agreement between the student and the instructor, who fixes the number of problem-solving workshops to be graded using this methodology and the deadlines for the presentation of the problem-sheets. The grade obtained by the student in these activities will correspond to the average of the grades achieved for each workshop. The tutoring sessions focus on discussions about the contents of the course and revision of the problem sheets solved by the student. The student might also have short tests to assess the degree of compliance with the objectives of the course.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Mixed objective/subjective test	A1 A3 B2 B3 B4 B7 C1 C2	Final exam that may include short questions, multiple choice questions, and problems similar to those solved throughout the course.	70
Problem solving	A3 A4 A15 A24 B1 B2 B3 B4 C1 C2 C6 C7	Aspects to be evaluated: The solution of the proposed problems and exercises in the seminars by the students, their participation in the discussions, and their interaction with the other students. WORKSHOPS and PROBLEM SOLVING will be assessed jointly.	30
Workshop	A5 A6 A8 A9 A10 A14 A16 B5 C2	Aspects to be evaluated: the exercises and activities carried out in the working sessions, the participation on the discussions, the interaction with the other students. WORKSHOPS and PROBLEM SOLVING will be assessed jointly.	0

Assessment comments

The final grade is the sum of:

- "Mixed test": up to 7 points.

- "Problem solving" + "workshop": up to 3 points.

To pass the course it is necessary to get a minimum of 5 points in that sum. Restriction: it is necessary to obtain a minimum of 2.8 (relative to a maximum of 7) in the ?mixed test?. If this minimum of 2.8 is not reached, the final grade will be the grade obtained in the ?mixed test?.

Since this is a continuous assessment model: the progression of the student throughout the semester can be graded with a maximum of 1 point that could be added to the final mark when the minimum in the mixed test is achieved.

The student will be graded if his/her participation in the course represents more than 20% of the global activities of the course.

In accordance with the regulations (?Probas de Avaliación e Actas de Cualificación de Grao e Mestrado?), the "2nd opportunity" (July) is only a second chance for the final exam (?mixed test?). The grade on this 2nd opportunity of the ?mixed test? will be added to those obtained during the course in ?problem solving? + ?workshops? . The percentages are the same as in the "1st opportunity".

?Matricula de honor (MH)? is the highest grade, awarded to very outstanding students having passed the course in the ?1st opportunity?. MH can be achieved in the "2nd opportunity" only if still available.

Only in very exceptional circumstances (adequately justified) the student may be exempted from the on going evaluation process. In that case, he must pass a special examination to prove, without any doubt, the overall level of knowledge and skills.

The teaching methodology and all activities performed during the course are designed according to a continuous evaluation model scheduled for a single academic year. Thus, the possibility of transferring partial qualifications to successive academic courses is not allowed.

Those students having a part-time dedication to the course, and thus waiver of assistance to the on-site academic activities according to the regulations of UDC, will be assessed as follows: 30% of the overall grade corresponds to the assessment of the personal work of the student (solution of problem-sheets), short tests and the personal interviews. The grades corresponding to this part are valid for both the first (June) and second (July) opprotunities. The remaining 70% of the grade corresponds to the assessment of the mixed test. Students have a second chance to be assessed with a mixed test in July. The grade obtained in July for the mixed test replaces that obtained in June. Given that the assessment of the course is based on a continuum-assessment model, students that do not pass the course will be treated as new students in the subsequent academic years.

Sources of information

Basic	- P. W. Atkins, T. L. Overton, J. P. Rourke, M. T. Weller and F. A. Armstrong. (2009). "Shriver and Atkins' Inorganic Chemistry" 5th ed. W. H. Freeman and company, New York - P. W. Atkins, T. L. Overton, J. P. Rourke, M. T. Weller y F. A. Armstrong (2008). "Química Inorgánica de Shriver y Atkins" Versión en español de la 4ª edición de "Shriver and Atkins' Inorganic Chemistry". McGraw-Hill Interamericana - J. Ribas Gispert (2008). "Coordination Chemistry" (versión en ingles de "Química de Coordinación"). Willey-VCH, Weinheim - J. Rivas Gispert (2000). "Química de Coordinación". Ediciones Omega S.A. - M.T. Weller (1999). "Inorganic Materials Chemistry". Oxford University Press, Oxford - L. Smart & E. Moore (1995). ?Una introducción a la química del estado sólido?, versión en español de "Solid State Chemistry: an Introduction". Ed. Reverté, Barcelona - L. Smart & E. Moore (1992). "Solid State Chemistry: an Introduction". Chapman & Hall, London - A.R. West (1984). "Solid State Chemistry and its Aplications". John Wiley & Sons, New York
Complementary	- A.F. Wells (1984). ?Structural Inorganic Chemistry? 5th Ed.. Oxford Univesity Press, London - A.F. Wells (1978). ?Química inorgánica estructural? Versión española de la 4ª Ed.. Ed. Reverté, Barcelona - S. F. A. Kettle (1998). "Physical Inorganic Chemistry. A Coordination Chemistry Approach". Oxford University Press

Recommendations
Subjects that it is recommended to have taken before
Química Física 1/610G01016 Química Física 2/610G01017 Química Inorgánica 1/610G01021 Química Inorgánica 2/610G01022
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Química Inorgánica 4/610G01024 Química Inorgánica Avanzada/610G01025 Ciencia de Materiais/610G01035
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.