



IDENTIFYING DATA

Chemistry: Chemistry Lab II

Subject	Chemistry: Chemistry Lab II			
Code	V11G201V01110			
Study programme	(*)Grao en Química			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	2nd
Teaching language	Spanish			
Department				
Coordinator	Lavilla Beltrán, María Isela			
Lecturers	Calle González, Inmaculada de la Carreira Casais, Anxo Estévez Guiance, Laura Hermida Ramón, José Manuel Lavilla Beltrán, María Isela Pena Pereira, Francisco Javier Pérez Cid, Benita			
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General description	In this subject it is intended that students start in the chemical laboratory and learn criteria and essential manipulations to work properly, safely and respectfully with the environment. The student will become familiar with the glass material, the instrumentation and the basic operations, achieving a learning that will allow him/her to approach other more specialized laboratories. Emphasis will also be placed on the observation and preparation of a laboratory notebook.			

Competencies

Code	
A1	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
B2	Organization and planning capacity
C25	Safely handle chemical substances, considering their physical and chemical properties, evaluating the risks associated with their use and laboratory procedures and including their environmental repercussions
C26	Perform correctly usual procedures in the laboratory, including the use of standard chemical instrumentation for synthetic and analytical work
C27	Demonstrate the ability to observe, monitor and measure chemical processes, by systematically and reliably recording them and presenting reports of the work done
C28	Interpret data derived from laboratory observations and measurements in terms of their meaning and relate them to the appropriate theory
C29	Demonstrate ability for numerical calculations and interpretation of experimental data, with correct use of units and estimation of uncertainty
D2	Capacity for teamwork
D3	Ability to communicate in both oral and written form in Spanish and / or Galician and / or English

Learning outcomes

Expected results from this subject	Training and Learning Results			
Apply safety standards in the laboratory	A1	B2	C25	D2
Use correctly the basic laboratory material, including the measurement material, and properly handle chemicals and their waste	A1	B2	C25 C26	D2

Use basic laboratory techniques and interpret the obtained data	A1	B2	C25 C26 C27 C28 C29	D2
Elaborate a notebook and/or an internship report	A1	B2	C27 C28 C29	D3
Measure chemical properties	A1	B2	C26 C27 C28 C29	D2
Identify chemical substances	A1	B2	C25 C26 C27 C28	D2

Contents

Topic	
Separation and identification of metals in aqueous solution	<ul style="list-style-type: none"> - Metals that precipitate as chlorides [Ag(I), Hg(I) and Pb(II)] (1 session) - Metals that precipitate as sulfates [Ca(II), Pb(II) and Ba(II)] (1 session) - Metals that precipitate as hydroxides [Fe(III), Cr(III) and Bi(III)] (1 session) - Metals that form amino complexes [Cu(II), Ni(II), Co(II) and Hg(II)] and alkaline earth metals [(Mg(II))] (1 session) - Identification of the metals present in a sample of unknown composition (1 session)
Titration	<ul style="list-style-type: none"> - Acid-base titrations: standardization of a solution of sodium hydroxide with potassium hydrogen phthalate and determination of total acidity in juices (2 sessions) - Redox titrations: standardization of a solution of potassium permanganate with sodium oxalate and determination of iron sulphate in tablets (2 sessions)
Determination of chemical properties	<ul style="list-style-type: none"> - Equation of state of ideal gases (1 session) - Colligative properties: Ebullioscopy (1-2 sessions) - Determination of the electromotive force in galvanic cells (1-2 sessions) - Electrolytic cells: Faraday laws (1-2 sessions)
Calorimetry	<ul style="list-style-type: none"> - Determination of heat of solution (1 session) - Determination of heat of neutralization (2 sessions)
Chemical equilibrium	<ul style="list-style-type: none"> - Study of a dissociation equilibrium (2 sessions)
Chemical kinetics	<ul style="list-style-type: none"> - Kinetic study of a chemical reaction (2 sessions)

Planning

	Class hours	Hours outside the classroom	Total hours
Introductory activities	4	0	4
Laboratory practical	50	45	95
Laboratory practice	3	15	18
Essay questions exam	3	15	18
Report of practices, practicum and external practices	0	15	15

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

Methodologies

	Description
Introductory activities	At the beginning of each laboratory session, the teacher will present the contents to be developed by the students. INTRODUCTORY ACTIVITIES WILL BE CARRIED OUT VIRTUALLY WHEN THE CIRCUMSTANCES REQUIRE IT.

Laboratory practical	<ul style="list-style-type: none"> - Laboratory experiments will be carried out in 18 sessions of 3 hours. - Prior to the completion of each practice, the student will have support material on FAITIC for the preparation of the experiments to be carried out. - During the development of the practices, the student will elaborate a laboratory notebook in which he / she must write down all the observations related to the experiment carried out. <p>LABORATORY PRACTICAL WILL BE CARRIED OUT VIRTUALLY WHEN THE CIRCUMSTANCES REQUIRE IT.</p>
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Personalized assistance

Methodologies	Description
Laboratory practical	Each student will be able to request from the teacher the clarifications that it deems appropriate for a better understanding of the subject and the successful development of the proposed tasks. These consultations will be attended during tutorials. PERSONALIZED ASSISTENCE WILL BE CARRIED OUT VIRTUALLY WHEN THE CIRCUMSTANCES REQUIRE IT.
Tests	Description
Laboratory practice	Each student will be able to request from the teacher the clarifications that it deems appropriate for a better understanding of the subject and the successful development of the proposed tasks. These consultations will be attended during tutorials. PERSONALIZED ASSISTENCE WILL BE CARRIED OUT VIRTUALLY WHEN THE CIRCUMSTANCES REQUIRE IT.
Essay questions exam	Each student will be able to request from the teacher the clarifications that it deems appropriate for a better understanding of the subject and the successful development of the proposed tasks. These consultations will be attended during tutorials. PERSONALIZED ASSISTENCE WILL BE CARRIED OUT VIRTUALLY WHEN THE CIRCUMSTANCES REQUIRE IT.
Report of practices, practicum and external practices	Each student will be able to request from the teacher the clarifications that it deems appropriate for a better understanding of the subject and the successful development of the proposed tasks. These consultations will be attended during tutorials. PERSONALIZED ASSISTENCE WILL BE CARRIED OUT VIRTUALLY WHEN THE CIRCUMSTANCES REQUIRE IT.

Assessment

	Description	Qualification	Training and Learning Results			
Laboratory practical	<ul style="list-style-type: none"> - The teacher will monitor the experimental work done by the student in the laboratory sessions through observation, questionnaires and / or the laboratory notebook. - Since it is a experimental subject, the ATTENDANCE to the laboratory sessions is COMPULSORY. - The absences in laboratory sessions must be duly justified. These absences will penalize the grade (whenever possible, it is recommended to recover the practice in another group). - More than 3 absences will mean failing the subject. 	50	A1	B2	C25 C26 C27 C28 C29	D2 D3
Laboratory practice	Two practical laboratory tests will be carried out to assess the competences and skills acquired by the student.	20	A1	B2	C25 C26 C27 C28 C29	D3
Essay questions exam	Once all the practical sessions are finished, two short written tests will be carried out regarding the concrete aspects of the operations carried out in the laboratory.	20	A1	B2	C28 C29	D3
Report of practices, practicum and external practices	At the request of the teacher, the student will prepare a report of one practice that reflects the work developed in the laboratory.	10	A1	B2	C27 C28 C29	D3

Other comments on the Evaluation

- Attendance at more than two laboratory sessions implies that the student is already being evaluated, so that his/her qualification in the record can not be "not presented".
- It is necessary to obtain a minimum grade of 4 (out of 10) in each of the sections of the evaluation to make an average. This criterion will also be applied in second call.
- The final grade will be the sum of the grades of all the sections provided that the required minimums are exceeded.
- In the case of not passing the subject, the grade of the record will be the weighted grade of the practical laboratory test

and essay question exam.

- In second call, the evaluation will be carried out in the following way: the score obtained by the student during the course will be kept in the section "laboratory practices" (not recoverable). The rest of the sections (laboratory practice, exam and report) can be recovered. The final grade will be the sum of the grades of all the sections as long as the required minimums are exceeded. If the subject is not passed, the grade of the record will be the weighted grade of the practical laboratory test and essay question exam.

IF LABORATORY PRACTICAL IS CARRIED OUT VIRTUALLY, THIS SECTION WILL BE ASSESSED THROUGH QUESTIONNAIRES AND/OR WORK (THE QUALIFICATION PERCENTAGE IN THIS CASE WILL BE 60%). BOTH WRITTEN TESTS WILL BE KEPT (QUALIFICATION PERCENTAGE WILL BE 40%). THE TWO PRACTICAL LABORATORY TESTS WILL NOT BE CONDUCTED (LABORATORY PRACTICE), AND THE PRACTICE REPORT WILL NOT BE REQUIRED. TO OBTAIN A MINIMUM GRADE OF 4 (OUT OF 10) IN EACH OF THE SECTIONS OF THE EVALUATION WILL CONTINUE TO BE REQUIRED TO MAKE AN AVERAGE.

Sources of information

Basic Bibliography

J. Guiteras, R. Rubio, G. Fonrodona, **Curso Experimental en Química Analítica**, 1, Síntesis, 2003

F. Burriel, F. Lucena, S. Arribas, J. Hernández, **Química Analítica Cualitativa**, 18, Thomson Paraninfo, S.A., 2006

S. Arribas, **Análisis Cualitativo Inorgánico**, 5, Paraninfo, 1993

P. Atkins, L. Jones, **Principios de Química**, 5, Panamérica, 2012

R. Chang, K. A. Goldsby, **Química**, 12, McGraw-Hill, 2016

R. H. Petrucci, F. G. Herring, J. D. Madura, C. Bissonnette, **Química General**, 11, Pearson, 2017

Complementary Bibliography

D. P. Shoemaker, C. W. Garland, J. W. Nibler, **Experiments in Physical Chemistry**, 8, McGraw-Hill, 2008

Recommendations

Subjects that are recommended to be taken simultaneously

Physics: Physics 2/V11G201V01107

Geology: Geology/V11G201V01106

Mathematics: Mathematics 2/V11G201V01108

Chemistry: Chemistry 2/V11G201V01109

Subjects that it is recommended to have taken before

Biology: Biology/V11G201V01101

Physics: Physics I/V11G201V01102

Mathematics: Mathematics 1/V11G201V01103

Chemistry: Chemistry Lab I/V11G201V01105

Chemistry: Chemistry 1/V11G201V01104

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 ===

* Teaching methodologies maintained

Introductory activities (virtual)

Laboratory practical (virtual whole or in part)

* Teaching methodologies modified

* Non-attendance mechanisms for student attention (tutoring)

Campus remoto, correo electrónico and FaiTIC

* Modifications (if applicable) of the contents

* Additional bibliography to facilitate self-learning

* Other modifications

If the evaluation is not possible in person, it will be carried out through the remote Campus and FaiTIC

=== ADAPTATION OF THE TESTS ===

* Tests already carried out

Test XX: [Previous Weight 00%] [Proposed Weight 00%]

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* Pending tests that are maintained

Test XX: [Previous Weight 00%] [Proposed Weight 00%]

...Laboratory practical [Previous Weight 50%] [Proposed Weight 60%]

Laboratory practice [Previous Weight 20%] [Proposed Weight 00%]

Essay questions exam [Previous Weight 20%] [Proposed Weight 40%]

Report of practices [Previous Weight 10%] [Proposed Weight 00%]

* Tests that are modified

[Previous test] => [New test]

* New tests

* Additional Information
