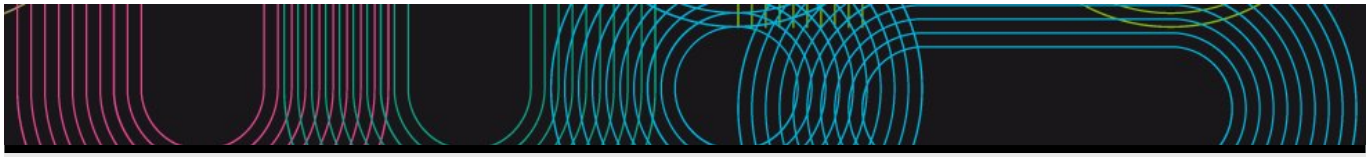

IDENTIFYING DATA				
Chemistry, physics and biology: Integrated laboratory I				
Subject	Chemistry, physics and biology: Integrated laboratory I			
Code	V11G200V01103			
Study programme	(*)Grao en Química			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Basic education	1st	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Lavilla Beltrán, María Isela Pérez Cid, Benita			
Lecturers	Estévez Martínez, Olivia Faro Rivas, Jose Manuel Lavilla Beltrán, María Isela Lorenzo Fernández, Paula Pena Pereira, Francisco Javier Pérez Cid, Benita Rodríguez Arguelles, María Carmen Salgueiriño Maceira, Verónica			
E-mail	isela@uvigo.es benita@uvigo.es			
Web				
General description	"Machine translation into english of the original teaching guide" In this matter pretends that students initiate and learn the criteria and indispensable manipulations to work in a chemical laboratory ia correct way, safe and respectful with the enviroment. Student will learn to use glass materials, instrumentation and basic operations, reaching skills that will allow them to work in specialized laboratories. There will be a focus on the observation and preparation of a laboratory notebook as well as in the realisation of a final report of the work carried out.			

Competencies	
Code	
A5	Students have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy
C25	Handle chemicals safely, considering their physical and chemical properties, including the evaluation of any specific risks associated with its use
C27	Monitor, by observation and measurement of physical and chemical properties, events or changes, and document and record them in a consistent and reliable way
C28	Interpret data derived from laboratory observations and measurements in terms of their significance and relate them to the appropriate theory
C29	Demonstrate skills for numerical calculations and interpretation of experimental data, with special emphasis on precision and accuracy
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
D5	Use information and communication technologies and manage basic computer tools
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 results of the work of laboratory and relate them with the appropriate theories.	A5	C28	D7 D9 D12 D14
Handle properly the common material in the chemical laboratory.	A5		D7 D9
Calibrate the experimental teams and use patterns when it was necessary.	A5	C28	D7 D9 D12 D13
Determine some properties of the chemicals: melting-point, boiling-point, *viscosidad, density, superficial tension, specific heat.	A5	C27	D6
Prepare dissolutions.	A5	C25	D7 D9 D12
Separate the components of mixes, so much *homogéneas like heterogeneous.	A5	C25	D7 D9 D12
*Predecir And check how a balance alters by addition or elimination of reagents, changes of volume, pressure or temperature.		C25 C27	D7 D9
Realise the necessary mathematical operations to quantify the processes carried out in the laboratory.	A5	C29	D3 D6 D7 D9 D12
Look for information on the properties (physical, chemical, dangerousness, etc.) of the chemicals.	A5		D4 D5 D9 D12
Apply the norms of security and hygiene in the chemical laboratory	A5	C25	D7 D9 D13 D15
Delete the waste generated in the laboratory of suitable form.	A5	C25	D7 D13 D15
Handle solids and liquids of safe way to temperature acclimatise in the atmosphere of the laboratory.	A5	C25	D7 D9 D15
Interpret the data derived of the measures realised in the laboratory.		C29	D3 D8 D9 D14
Elaborate a fascicle of laboratory that register of systematic way all the events and changes observed in the development of the work of laboratory.	A5	C27	D1 D4 D9 D12
Handle the techniques and the scientific instrumentation-technical of the inmunochemistry	A5		D7 D8 D9 D12 D15
Separate, isolate, identify and quantify the distinct *biomoléculas.	A5	C25	D14
Realise an assessment of the risks associated to the use of chemicals.		C25	D7 D9 D15

Contents
Topic
1) Norms of hygiene and security in the laboratory (1 session).
2) basic Concepts of the calculation of errors in the measures: I handle of the calibrate and analysis of distribution of populations (1 session).
3) Recognition and utilisation of the basic material of laboratory. Design of a fascicle of laboratory (1 session).
4) Determination of densities of liquids and solid (1 session).
5) Preparation of dissolutions (2 sessions): to) From a solid solute (exact and approximate concentration). *b) From a liquid solute (*Ej.: *HCl, *H2SO4, etc.). *c) Prepare dissolutions diluted of the ready previously.
6) Measure of the superficial tension (1 session).
7) Measure of the *viscosidad (1 session).
8) Establishment of a chemical equation: stoichiometry (1 session).
9) Separation of the components of a mix by means of sublimation and leak (1 session).
10) Reactions of precipitation (1 session).
11) Heat of reaction. (1 session).
12) Isolation of organic compounds: liquid extraction-liquid. (1 session).
13) Purification of liquids: distillation (1 session).
14) Purification of solids: crystallisation. Measure of melting-points. (1 session).
15) Study of the chemical balance. Principle of Him *Chatelier (1 session): to) Effect of the temperature. *b) Effect of the concentration.
16) Specific heat of liquids and solid (1 session).
17) Determination semi-quantitative by the technical of Dot-Blot of the presence of a protein in a proteins mixture inmobilized in a membrane of nitrocelulosa (1 session).
18) Determination semi-quantitative of the presence of an antigen in a proteins mixture by the method of Ouchterlony of double difusión in agarose gel (1 session).
19) Specific detection and *semi-quantitative of antibodies of high molecular weight in phase *soluble @perante it technical of *aglutinación of particles of *látex *recubertas with the *antíxeno (1 session).
20) ELISA *sandwich, technical *inmunoenzimática stop the specific and quantitative detection of *antíxenos and antibodies in solid phase (2 sessions).
21) *Volumetrías acid-base (2 sessions): it) Assessment of hydroxyde of sodium with hydrogen *ftalato of *potasio. *b) Assessment of sour *clorhídrico with hydroxyde of sodium prepared in (it).
22) *Volumetrías *redox (1 session): it) Assessment of *oxalato of sodium with *permanganato of *potasio.

Planning			
	Class hours	Hours outside the classroom	Total hours

Laboratory practises	70	40	110
Master Session	5	0	5
Short answer tests	2	8	10
Practical tests, real task execution and / or simulated.	3	7	10
Reports / memories of practice	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
Laboratory practises	They Will realize experiments of laboratory, of individual form, in sessions of 3 hours #each. The student will have of the scripts of practices and questionnaires related as well as of material of support, in the platform *Tem@, so as to that can have a previous knowledge of the same that allow him prepare the experiments to realize. During the development of the practices the student will elaborate a fascicle of laboratory in the that will owe to note all the relative observations to the experiment realized. In any cases, will owe also elaborate a report of practices and/or questionnaire to petition of the professor that require it.
Master Session	To the start of each session of laboratory, the professor will do an exhibition of the contents to develop by the students.

Personalized attention

Methodologies	**Description**
Laboratory practises	Each student will ask to the professor the explanations that estimate timely for a better understanding of the matter and to develop successfully the tasks that were him proposed. These queries will do in *horado of *tutorías.
Tests	**Description**
Reports / memories of practice	Each student will ask to the professor the explanations that estimate timely for a better understanding of the matter and to develop successfully the tasks that were him proposed. These queries will do in *horado of *tutorías.

Assessment

	Description	Qualification	Training and Learning Results		
Laboratory practises	The professor will realize a tracking, through questionnaires and/or of the fascicle elaborated, of the experimental work realized pole student in the sessions of laboratory. Since it is a subject of experimental type, is mandatory the assistance to the sessions of laboratory. The foul of assistance, still being justified, *penalizará the note (pole that always that it was possible, and treating of fouls justified, recommends to recover the practice in another group). If the number of absences is upper to 6 will suppose to suspend the subject.	40	A5	C25 C27 C28 C29	D1 D3 D4 D5 D6 D7 D8 D9 D12 D13 D14 D15
Short answer tests	Once finished all the practical sessions, will realise a proof written (of brief answer) relative to concrete appearances of the operations realised in the laboratory. The date of the proof will publish with previously.	20		C28 C29	D1 D3 D6
Practical tests, real task execution and / or simulated.	It will realise a practical proof (a session of laboratory) that will allow to evaluate the competitions and skills purchased by the student. Said proof will be realised of independent form for each group of practices. This proof will carry out the day established in the official calendar of evaluations.	30	A5	C25 C27 C28 C29	D1 D3 D6 D7 D9 D12 D13 D14 D15
Reports / memories of practice	By request of the professor, the student will elaborate reports of practices that reflect the work developed in the laboratory.	10	A5	C28 C29	D1 D4 D5 D6 D14

Other comments on the Evaluation

To The assistance to more of two sessions of laboratory involves that the student already is being evaluated, pole that, his qualification in the proceedings will not be able to be no presented.

It IS necessary to obtain a minimum note of 4 on 10 in each of the *apartados of the evaluation for power do average; in the *apartado "reports" will be necessary, *asimesmo, obtain a minimum note of 4 on 10 inform us of the subjects of #each of the areas that evaluate them; all the previous *aplicaráse also the second announcement. In the case of not surpassing the subject, the qualification in the proceedings will be the note pondered of the practical proof of laboratory.

In the second announcement to evaluation *levaráse to cape of the following way:

*Conservaráse The punctuation achieved pole student during it study in the *apartado "practical of laboratory" (40%), no recoverable.

In the case of not having obtained the minimum note demanded in any of the remaining *apartados *poderánse recover the following:

1) "Proof of short answer" (20%); the date of the *examen will be the one who fix the official calendar.

2) "practical Proof" (30%); the date of the *examen will be the one who fix the official calendar.

3) "Reports of practical" (10%); *entregaránse in advance the official date of the *examen *dacordo *cas indications of the teaching staff.

The final qualification will be the sum of the notes of all the *apartados always that they surpass the minima demanded. Of not being the case, the qualification that will figure in the proceedings will be the note pondered of the practical proof (dictate sense will not be able to be inferior it of the first announcement).

Sources of information

Basic Bibliography

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

C.K. Mathews, K.E. Van Holde, D.R. Appling, S.J. Anthony-Cahill, **Bioquímica**, 4ª Ed., Pearson Educación, 2013

J. R. Taylor, **Introducción al análisis de errores: estudio de las incertidumbres en las mediciones físicas**, Reverté, 2014

A. de Carlos Villamarín, J.M. Faro Rivas, **Manual de técnicas experimentais en bioloxía molecular e celular**, Servizo de Publicacións da Universidade de Vigo, 2014

R. Chang, **Química**, 12ª Ed., McGraw-Hill Education, 2017

Complementary Bibliography

D.R. Palleros, **Experimental Organic Chemistry**, John Wiley, 2000

P.A.Tipler, G. Mosca, **Física para la Ciencia y la Tecnología (2 volúmenes)**, 6ª Ed., Reverté, 2010

I. Lefkovits, **Immunology methods manual: the comprehensive sourcebook of techniques**, Academic Press, 1997

D. Voet, J.G. Voet, **Bioquímica**, 3ª Ed., Editorial Médica Panamericana, 2006

R.H. Petrucci, W.S. Harwood, F.G. Herring, **Química General: principios y aplicaciones modernas**, 11ª Ed., Pearson Educación, 2017

Recommendations

Subjects that continue the syllabus

Chemistry, physics and geology: Integrated laboratory II/V11G200V01202

Subjects that are recommended to be taken simultaneously

Biology: Biology/V11G200V01101
Physics: Physics I/V11G200V01102
Mathematics: Mathematics I/V11G200V01104
Chemistry: Chemistry I/V11G200V01105