



## 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 Calle González, Inmaculada de la Couce Fortúnez, María Delfina  
García Martínez, Emilia  
Lavilla Beltrán, María Isela  
Leao Martins, Jose Manuel  
Muñoz López, Luis  
Pérez Cid, Benita  
Salgueiriño Maceira, Verónica  
Suarez Alonso, Maria del Pilar

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 technicians and the scientific instrumentation-technical of the biochemistry and the molecular biology.	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, \*H<sub>2</sub>UNDER4, 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) Purification of liquids: distillation (1 session).
- 12) Isolation of organic compounds: liquid extraction-liquid. (1 session).
- 13) Heat of reaction. (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 Heats of liquids and solid (1 session).
- 17) Extraction of present lipids in the \*yema of egg. Methods of extraction and identification of the distinct types of lipids. Methods of chromatography in fine layer of lipids (\*CCF) (1 session).
- 18) sour Volumetries-basic (2 sessions):  
to) Assessment of hydroxide of sodium with hydrogen \*ftalato of potassium.  
\*b) Assessment of acid \*clorhídrico with the hydroxide of ready sodium in (to).
- 19) Isolation of nucleic acids. Method of extraction and identification of nucleic acids. Methods of colorimetric reaction (1 session).
- 20) Determination of the concentration of proteins in liver of rat. Realisation of a straight pattern (1 session).
- 21) Volumetries \*redox (2 sessions):  
to) Assessment of \*oxalato of sodium with \*permanganato of potassium.  
\*b) Determination of the concentration of a dissolution of \*hipoclorito by means of assessment with \*tiosulfato.
- 22) Isolation of glycogen. Extraction by means of precipitation and extraction with alcohol (1 session).
- 23) Determination of the concentration of glucose. Specific chemical methods colorimetric (1 session).

<b>Planning</b>			
	Class hours	Hours outside the classroom	Total hours
Laboratory practises	72	40	112
Master Session	6	0	6
Short answer tests	2	6	8
Practical tests, real task execution and / or simulated.	3	6	9
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.

<b>Methodologies</b>	
	Description
Laboratory practises	They will realise experiments of laboratory, of individual form, in sessions of 3 hours each one. The student will have of the scripts of practices and questionnaires related as well as of material of support, in the platform *tem@, so that it can have a previous knowledge of the same that it allow him prepare the experiments to realise. During the development of the practices the student will elaborate a fascicle of laboratory in which it will have to annotate all the relative observations to the experiment realised. It will owe also elaborate a report of practices and/or questionnaire on request 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.

<b>Personalized attention</b>	
<b>Methodologies</b>	<b>Description</b>
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.
<b>Tests</b>	<b>Description</b>
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.

<b>Assessment</b>				
	Description	Qualification	Training and Learning Results	
Laboratory practises	The professor will realise a follow-up, through questionnaires and of the fascicle of laboratory, of the experimental work realised by the student in the sessions of laboratory. Since it treats of a matter of experimental type, is compulsory the assistance to the sessions of laboratory. If the number of absences (even being justified) is upper to 6 will suppose to suspend the *asignatura.	40	A5	C25 D1 C27 D3 C28 D4 C29 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 *antelación.	20		C28 D1 C29 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 D1 C27 D3 C28 D6 C29 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	D1
				C29	D4
					D5
					D6
					D14

### Other comments on the Evaluation

The assistance to more than two sessions of laboratory involves that the student already is being evaluated, by what his qualification in the record will not be able to be no presented. Is necessary to obtain a minimum note of 4 on 10 in each one of the sections of the evaluation to be able to do the average; in the section "reports"; it will be necessary to obtain a minimum note of 4 on 10 in the reports of the matters of each one of the matters that evaluate them; all the previous will apply also to the second announcement. In the case of not surpassing the matter, the qualification in the record will be the note ponderada of the practical proof of laboratory. In the second announcement the evaluation will carry out of the following way: will conserve the punctuation obtained by the student during the course in the section "practices of laboratory"; (40%), no recoverable. In case of have not obtained the minimum note demanded in any of the remaining sections will be able to recover the following: 1) "Proof of short answer"; (20%); the date of the examination will be the one who fix in the official calendar. 2) "practical Proof"; (30%); the date of the examination will be the one who fix in the official calendar. 3) "Reports of practical"; (10%); they will deliver with antelación to the official date of the examination in accordance with the indications of the profesorado. The final qualification will be the sum of the notes of all the sections whenever they surpass the minima demanded. Of not being the case, the qualification that will appear in the record will be the note ponderada of the practical proof (said note will not be able to be inferior to the one of the first announcement).

### Sources of information

Mathews-Van Holde, **Bioquímica**, McGraw-Hill, 4ª Ed. 2013,  
R.D. Palleros, **Experimental Organic Chemistry**, John Wiley and Sons, 2000,  
M.A. Martínez Grau, A.G. Csasky, **Técnicas Experimentales en Síntesis Orgánica**, Síntesis, 2ª Ed. 2012,  
P.A. Tipler, G. Mosca, **Física para la Ciencia y la Tecnología (2 volúmenes)**, Reverté, 6ª Ed. 2010,  
Voet D., Voet J.G., **Bioquímica**, Editorial Médica Panamericana, 2006,  
E. Gettys, F.J. Keller, M.J. Skove, **Física Clásica y Moderna**, McGraw-Hill, 1991,  
R. Chang, **Química**, McGraw-Hill, 11ª Ed, 2013,  
R.H. Petrucci, W.S. Harwood, F.G. Herring, **Química General**, Prentice Hall, 10ª Ed. 2011,  
J. Guiteras, R. Rubio, G. Fonrodona, **Curso experimental en Química Analítica**, Síntesis, 2003,

### 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