UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2021/22
Subject (*)	Analytical Chemistry 2		Code	610G01012
Study programme	Grao en Química			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Second	Obligatory	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química			
Coordinador	Turnes Carou, Maria Isabel	E-mail	isabel.turnes@udc.es	
Lecturers	Moreda Piñeiro, Jorge Turnes Carou, Maria Isabel	E-mail	jorge.moreda@udc.es isabel.turnes@udc.es	
Web				
General description	The aim of this subject is the study of the sampling strategies, sample pre-treatment and treatment methodologies and separations techniques. Basic fundamentals of electroanalytical techniques (condutometry and potentiometry) are also enclosed in the scope of this subject			
Contingency plan	1. Modifications to the contents Contend changes are not considered 2. Methodologies All Teaching methodologies are maintained. All methodologies will be face-to-face and the programming established in the coordination calendar of the Center will be maintained. In cases where the capacity of the assigned classroom is exceeded, a second classroom will be enabled for the teaching of the class through TEAMS for students who are not in the classroom with the teacher. In the case of non-face-to-face caused by COVID-19 disease outbreaks, all teaching methodologies are adapted to the non-face-to-face modality through Moodle and Teams and the programming established in the coordination calendar of the Center is maintained. The guest lectures and seminars will be taught through the Teams Platform synchronously at the time specified in the course schedule. The laboratory practices will be replaced by virtual activities. The mixes objective/subjective test will be carried out through the Moodle Platform (on-line test). 3. Mechanisms for personalized attention to students All teaching methodologies will be supervised virtually (through the Moodle Platform and Teams) by the teacher during class time. The personalized follow-up will be done through email, the Moodle platform and the TEAMS tool, at the request of the students and, as far as possible, at the time established for the tutorials. For students with part-time dedication or specific learning modalities or diversity support, personalized attention will be provided within the flexibility allowed by coordination schedules and material and human resources. 4. Modifications in the evaluation No changes in the evaluation are considered *Evaluation observations: Remarks included in the guide are maintened 5. Modifications to the bibliography or webgraphy Bibliography suport changes are not considered. All the necessary materials will be available in Moodle or through access to the electronic resources available in the Library of the Center.			

Study programme competences	
Code	Study programme competences
A7	Knowledge and application of analytical methods
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
A17	Ability to work safely in a chemistry laboratory (handling of materials, disposal of waste)
A18	Risk management in relation to use of chemical substances and laboratory procedures
A19	Ability to follow standard procedures and handle scientific equipment
A20	Ability to interpret data resulting from laboratory observation and measurement
A21	Understanding of qualitative and quantitative aspects of chemical problems
A22	Ability to plan, design and develop projects and experiments
A23	Critical standards of excellence in experimental technique and analysis
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
B2	Effective problem solving
B3	Application of logical, critical, creative thinking
B4	Working independently on own initiative
C1	Ability to express oneself accurately in the official languages of Galicia (oral and in written)
C6	Ability to assess critically the knowledge, technology and information available for problem solving
C8	Understanding role of research, innovation and technology in socio-economic and cultural development

Learning outcomes			
Learning outcomes	Study programme competences		
Knowledge and application of Sampling techniques and preparation of sample to the analysis.	A7 A16	B2 B3	C1 C6
Application of main separation techniques	A7 A15 A21	B2 B3	C1 C6
To acquire the basic skill in the laboratory of Analytical Chemistry	A17 A18 A19 A20 A22 A23	B4	C1 C6
Ability to explain phenomena and processes related to Analytical Chemistry clearly	A7 A24 A25	B3	C1 C8

Contents	
Topic	Sub-topic
Sampling techniques and preparation of sample	Sampling theory and methodology Sample pretreatament Sample preparation methods
Separation techniques	Precipitation Distillation Extraction ionic exchange Clasical electrophoresis Chromatography

Electroanalytical techniques	Conductometry Potentiometry
Laboratory experiments	Preparation of mussels samples for metal analysis Determination of fat content in food Concentration of trace elements in water by ion exchange Extraction of caffeine from beverages Separation of plant pigments by thin layer chromatography Conductimetric titrations: composition of strong and weak acids mixture. determination of acetylsalicylic acid in Aspirin

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Laboratory practice	A7 A15 A17 A18 A19 A20 A22 A23 A24 B2 B3 B4 C6 C8	20	20	40
Seminar	A7 A15 A20 A21 A22 A24 A25 B2 B4 C1	8	20	28
Guest lecture / keynote speech	A7 A16 A21 A22 A24 A25 B3	24	54.48	78.48
Mixed objective/subjective test	A7 A15 A20 A24 B2 B3 B4 C1	3	0	3
Personalized attention		0.52	0	0.52
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Laboratory practice	In the laboratory sessions students will carry out the application of the theoretical concepts studied in the classroom. The scripts will have questions that the students will have to answer and deliver once finished the practices. During laboratory sessions, and on a simultaneous way to the realisation of the experiments, the student will have to elaborate a diary of laboratory that collect the calculations, the experimental procedures and the necessary settings. The professor will review the notebook of each student in each laboratory session.
Seminar	On site activities for small to very small groups in which the students must participate actively. Seminars will be mostly devoted to solve examples of real problems and numerical excercises. The problems are discussed and solved by the students following the guidance of the instructor.
Guest lecture / keynote speech	The teacher will present the fundamental contents of each of the topics. For better learning, students will have to advance the development of these sessions teaching materials suitable for your personal preparation.
Mixed objective/subjective test	The test to evaluate the knowlege gained by the student will include both theoretical and numerical questions.

Personalized attention	
Methodologies	Description

Seminar Laboratory practice	The work developed by students in seminars and laboratory practice involves personal attention from the teacher both in the resolution of questions as a guide to the preparation thereof, correction questionnaires, understanding fault indication etc. In addition, Professor mention to the student individually to discuss in more depth how their learning progress of matter. Moreover, all students can consult the teacher any aspect of the subject in the tutorial schedule established for this purpose. Students being recognized officially as partial-time and entitled not to attend the lectures will be attended in a tutorships regime (set hour with teacher in advance).

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Seminar	A7 A15 A20 A21 A22 A24 A25 B2 B4 C1	It will assess the student's participation, the resolution of problems and numerical excercises, compliance dates for delivery or revision. Some short tests will be done periodically in the seminar sessions and /or guest lecture to assess the evolution of the student.	20
Laboratory practice	A7 A15 A17 A18 A19 A20 A22 A23 A24 B2 B3 B4 C6 C8	It will assess the performance of questions, abilities and skills of students in the experimental work, their ability to interpret the results, etc.	20
Mixed objective/subjective test	A7 A15 A20 A24 B2 B3 B4 C1	It will assess the student's ability to express, summarize and develop theoretical aspects of the subject and the resolution of problems and numerical exercises.	60

Assessment comments

To pass the subject three basic requirements are needed:
1.-The laboratory sessions are mandatory.
2.-Reach a minimum qualification of 5 over 10 in the laboratory practice and in each mixed test.
3. Students who do not participate on the problem solving and do not carry out the short answer questions will score 0 in these sections (20%).
-In the first and second time, students who not reach 5 points in practices evaluation, have the opportunity to, in addition to the mixed test, perform a specific test related to the labs. The score of this test especcífica replaced the grade obtained in practice for the overall rating.
The student will obtain the qualification of No Presented when the student does not assist to laboratory sessions and to the final mixed exam.
In the evaluation of the subject, all that is established in article 14, regarding the Fraud Commission and disciplinary responsibilities, of the UDC's Rules for the Evaluation of Degrees and Master's Degrees, will be applied.
In the context of "continuous evaluation" the "second opportunity of July" is a second opportunity of realisation of the mixed test. Therefore, the laboratory practice, and seminars, will keep the qualifications obtained along the course, whereas the qualification of the mixed test of second opportunity will substitute to the one obtained in the mixed test of the fisrt opportunity.
The students evaluated in the "second opportunity" only will be able to opt to matrícula of honour if the maximum number of these for the corresponding course has not covered in its whole in the "first opportunity".
- For students with recognition of dedication and part-time academic exemption waiver assistance, conducting laboratory practices are mandatory and it will be provided within the flexibility to allow coordinating schedules and material and human resources. They shall be deemed exempt from the keynote sessions while assistance will be provided to the greatest number of seminars. Therefore, these students will be evaluated by the grades obtained in laboratory practices (20%), in the mixed test (60%) and in the activities of the seminars (20%). If they can not attend the seminars will make a mentored work.
For those students who apply for the advance assessment in December, the considerations indicated in the teaching guide for the previous year will be applied.

Sources of information	
Basic	- CÁMARA, C.; FERNÁNDEZ, P.; MARTÍN-ESTEBAN, A; PÉRZ-CONDE, C.; MIQUEL VIDAL (2002). Toma y Tratamiento de Muestra. Madrid, Ed. Síntesis - SKOOG, D.; WEST, D.N.; HOLLER, F.J.; CROUCH, S.R. (2005). Fundamentos de Química Analítica . Madrid, Ed. Thomsom, 8ª edición - HARRIS DANIEL C (2007). Análisis Químico Cuantitativo. Barcelona, Ed. Reverté, 3ª Edición
Complementary	- VALCARCEL, M. & GÓMEZ, A. (1988). Técnicas Analíticas de Separación. Barcelona, Ed. Reverté - HARVEY, D. (2002). Química Analítica Moderna. Madrid, Ed. McGraw-Hii - GAVIRA VALLEJO, J.M. HERNANZ GISMERO, A. (2007). Técnicas Físicoquímicas en Medio Ambiente. Madrid, Ed.Libreria UNED

Recommendations
Subjects that it is recommended to have taken before
General Chemistry 3/610G01009 Analytical Chemistry 1/610G01011
Subjects that are recommended to be taken simultaneously
Chemistry Laboratory 2/610G01032
Subjects that continue the syllabus
Instrumental Analytical Chemistry 1/610G01013 Instrumental Analytical Chemistry 2/610G01014
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.