



IDENTIFYING DATA

Sample preparation techniques

Subject	Sample preparation techniques			
Code	O01G041V01305			
Study programme	Grado en Ciencia y Tecnología de los Alimentos			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Martínez Carballo, Elena			
Lecturers	Cancho Grande, Beatriz González Barreiro, Carmen Martínez Carballo, Elena			
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Web				
General description	<p>The proper treatment of a sample is a key aspect in the chemical analysis of any food matrix. This step is often time consuming and subject to the introduction of numerous errors.</p> <p>In this course, we will go in depth into the techniques and methods of sample preparation (including pretreatment) for both inorganic and organic analysis.</p> <p>International students may request from the teachers: a) resources and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.</p>			

Training and Learning Results

Code	
A2	Students will be able to apply their knowledge and skills in their professional practice or vocation and they will show they have the required expertise through the construction and discussion of arguments and the resolution of problems within the relevant area of study.
B1	Students will acquire analysis, synthesis and information-management skills to contribute to planning and conducting research activities in the food field.
B2	Students will acquire and put teamwork skills and abilities into practice, whether these have multidisciplinary character or not, in both national and international contexts, becoming familiar with a diversity of perspectives, schools of thought and practical procedures.
C1	To know the physical, chemical and biological foundations of food and its technological processes.
C2	To be familiar with the chemistry and biochemistry of food and of its associated technological processes.
C4	To be familiar with the physical and chemical properties of food, as well as the analytical processes that are associated with their establishment.
C5	To be familiar with the basic operations in the food industry.
C9	To be familiar with the basics of economics, market techniques, food and agriculture management and marketing.
D1	Analysis, organization and planning skills.
D3	Ability to communicate, both orally and in writing, in local and foreign languages.
D5	Problem-resolution and decision-making skills.
D8	Critical and self-critical thinking skills.
D9	Interdisciplinary teamwork skills.

Expected results from this subject

Expected results from this subject	Training and Learning Results
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ER1. To enable the student to obtain a detailed and up-to-date knowledge of the different theoretical and practical aspects of sample preparation techniques.			C1 C2 C4	D1 D5 D8
ER2. To enable the student to apply the chemical knowledge acquired to the understanding and resolution of real sample preparation problems.	A2	B1 B2	C1 C2 C5 C9	D3 D9
ER3. Identify the different pre-treatment and pre-treatment stages of the sample.			C1 C2 C4 C5 C9	D1 D8
ER4. Develop laboratory experiments using already described procedures and introduce modifications to adapt them to new conditions.	A2	B2	C4 C5	D5 D8 D9

Contents

Topic	
1. The preparation of samples in the Alimentary Industry	1. The analytical process. 2. Taking of sample: general Appearances. 3. Previous treatments to the preparation of the sample.
2. Analysis of data in Analytical Chemistry	4. Parameters of quality of the analytical methods. 5. Statistics applied to the control of quality of the analytical methods.
4. Technicians of separation in Alimentary Analytical Chemistry	10. Aided by extraction microwaves. 11. Extraction accelerated with dissolvent. 12. Microextracción In solid and liquid phase.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	28	8	36
Autonomous problem solving	14	42	56
Laboratory practical	14	14	28
Problem and/or exercise solving	0	15	15
Objective questions exam	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
Lecturing	The session *magistral treats of a didactic strategy fundamentally informative that characterises by the oral exhibition of the professor of the *temario of the program during sessions of 50 minutes with the support of presentations in Power *Point, come them and blackboard. After each subject will realise a small test to know the degree of knowledge of the student.
Autonomous problem solving	The seminars are a complement ideal and necessary of the program of theoretical lessons. This tool allows: 1. Complement theoretical and practical appearances in which it could not deepen properly during the sessions *magistrales. 2. Resolve exercises, problems and questions related with the distinct subjects of the matter carried out by the student of autonomous form. 3. Argue the results obtained and orient to the student in his presentation to the rest of the class. The seminars will develop along the academic course, treating to coincide well with the end of the subjects or thematic blocks.
Laboratory practical	The program of practical classes is oriented to familiarise to the student with the handle of the technicians of treatment of sample. The practices selected so that his development was coherent with the rest of activities of the matter like classes of theory and seminars. These classes are compulsory, will carry out in the laboratory of the centre and will realise in groups between two and three people. The purpose of this activity is to boost the work in group, that the student apply the knowledges purchased in the theoretical class, stimulate the capacity of *autoaprendizaje and complete of solid form the knowledges purchased. The sessions of practices will begin always with a discussion detailed of all the process by part of the professor. During these sessions, each light up will collect in his fascicle of laboratory all those appearances of importance on the work realised: so much theoretical as of procedure, as well as of necessary calculations and interpretation of results.

Personalized assistance

Methodologies	Description
Autonomous problem solving	The continuous evaluation allows to be still in all moment the progress of the student of form *individualizada, adapting the activities of the course to complement and support the knowledges seen in the masterclasses and seminars. Of this way will be able to reinforce the weak points of the learning to measure that advances the course. The personalised attention will complete by means of the *tutorías. In these *tutorías the *profesorado will comment with the student the doubts that could arise in the sessions *magistrales or in the resolution of bulletins/questionnaires.
Laboratory practical	The personalised attention will complete during the realisation of the practices of laboratory by means of the *tutorías. In the *tutorías the *profesorado will comment with the student the doubts that could appear in the sessions of practices.

Assessment

	Description	Qualification	Training and Learning Results			
Autonomous problem solving	Seminars will be assessed by means of some written tests in which problems, exercises and practical cases of each topic and/or thematic block will be solved. They evaluated the expected results ER1, ER2 and ER3.	20	A2	B1 B2	C1 C2 C4 C5	D1 D3 D5 D8 D9
Laboratory practical	In order to pass the course it is compulsory: 1. Completion of all the practicals. 2. The elaboration and delivery of a report for each of the practicals carried out within the time established by the teaching staff. 3. Achievement of at least 4.5 points out of 10 in the practical exam to be taken at the end of the internship. In the assessment of this item, the attitude, involvement and participation of the student during the practical exercises in the laboratory will also be taken into account. ER4 will be assessed.	20	A2	B1 B2	C1 C2 C4 C5	D1 D3 D5 D8 D9
Problem and/or exercise solving	The understanding and internalisation of the contents of the subject will be assessed by means of an exam consisting of problems based on real cases. A minimum mark of 4.0 out of 10 is required to pass this practical part. Expected results ER1, ER2 and ER3 will be assessed.	40	A2	B1	C1 C2 C4 C5 C9	D1 D3 D5 D8
Objective questions exam	The understanding and internalisation of the contents of the subject will be assessed by means of an exam consisting of theory questions. A minimum mark of 4.0 out of 10 is required to pass this theoretical part. Expected results ER1, ER2 and ER3 will be assessed.	20	A2	B1	C1 C2 C4 C5	D1 D3 D5 D8 C9

Other comments on the Evaluation

EVALUATION

The enrolled student may choose to be assessed on a continuous or global evaluation and must notify the coordinating lecturer of his or her decision during the first month of the course (if no notification is received within the specified time, it is assumed that the student will be assessed on a continuous evaluation). The different forms of assessment are detailed below:

A. Continuous Evaluation:

Final mark (NF) = Resolution of problems and/or exercises (Problems Exam (EP=40%)) + Exam of objective questions (Theory Exam (EP=20%)) + Laboratory Practicals (PL=20%) + Seminars (S=20%).

- The student will pass the course when the weighted average of all the items is equal or higher than 5.0.

- Problems and Theory Exam: it is necessary to obtain a minimum of 4.0 points out of 10 in the exams in order to pass the course. These exams will account for 40% and 20% of the total mark for the course, respectively.
- Laboratory Practicals: in order to pass the subject it will be compulsory to attend 80% of the Laboratory Practical sessions, the remaining 20% must be duly justified (according to the criteria established in the Regulation on the evaluation, grading and quality of teaching and the learning process of the students of the University of Vigo). The practical classes will be graded by means of the evaluation of the reports submitted and a Practical Examination, each one representing 50% of the overall mark for this item. A minimum of 4.0 points out of 10 in the Practical Examination will be necessary to pass the subject.
- **Seminars: the grade in this section will be the average of the grades** obtained in each of the tests and will be worth 20% of the overall grade for the subject.
- Calification of the subject: for the student who does not pass the exams in the 1st Edition (grade higher than 4.0), the grade of the subject will be the grade of the exam, without adding the part corresponding to Seminars and Laboratory Practicals.

B. Global Evaluation

Final mark (NF) = Final Test (PF=80%) + Laboratory Practicals (PL=20%).

- In this modality the student will be able to take a Final Exam which will represent 80% of the overall mark and which will be different from the exam for students who choose continuous assessment.
- Students who opt for this assessment should have taken the Laboratory Practicals and the Practical Examination beforehand, as they are compulsory. Students with work responsibilities By default, students will be considered as following the subject in a normal mode in which they have time availability to attend the teaching activities. In the case of students who are unable to do so for duly justified work reasons, they should contact the subject coordinator during the first month of the course by e-mail. The coordinator will indicate to each student, depending on their case, how they should study and take the Seminar and Laboratory Practicals exams. The rest of the evaluation will be the same as for other students.

EXAM DATES

The exam dates are those approved by the Faculty of Science (in case of error in the transcription of the exam dates, the valid dates are those officially approved and published on the notice board and on the Centre's website):

- January 20, 2025, 4:00 p.m. (1st Edition).
- July 8, 2025, 3:30 p.m. (2nd Edition).
- September 23, 4:00 p.m. (End of Degree).

The use of any electronic device will not be allowed during the evaluation tests. Doing so will be considered as a reason for not passing the subject in the current academic year, and the grade will be 0.

The material allowed for the written tests will consist of the test statement, writing utensils and calculator. The use of any electronic device will not be allowed. Failure to comply with these rules will be punished with a failing grade (0) in the exam session in which the non-compliance occurs.

SUCCESSIVE ACADEMIC YEARS

Those students who do not pass the subject in the current academic year, but who do pass the Laboratory Practicals, will have their grade for this item maintained in successive examinations. Ethical commitment.

USE OF MOBILE DEVICES

All students are reminded of the prohibition of the use of mobile devices in exercises and practices, in compliance with Article 13.2.d) of the University Student Statute, regarding the duties of university students, which establishes the duty to Refrain from the use of or cooperation in fraudulent procedures in evaluation tests, in the work performed or in official university documents.

ACADEMIC FRAUD

All students are reminded that the first section of Article 42 of the REGULAMENTO SOBRE A AVALIAÇÃO, A CALIFICAÇÃO E A CALIDADE DA DOCENCIA E DO PROCESO DE APRENDIZAXE DO ESTUDANTADO (Aprobado no claustro do 18 de abril de 2023) states that:

1. A fraudulent performance in any evaluation test will imply a qualification of zero (suspense) in the minutes of the evaluation opportunity of the corresponding call, this regardless of the value that on the overall qualification of the test in question and without prejudice to the possible consequences of disciplinary nature that may occur.

CONSULTATION/APPLICATION FOR TUTORIALS

Tutorials can be consulted through the personal page of the teaching staff, accessible through <http://fcou.uvigo.es/es/docencia/profesorado/>.

Sources of information

Basic Bibliography

Cámara, C., **Toma y tratamiento de muestras**, Editorial Síntesis, 2004

Cela R.; Lorenzo, R.A.; Casais, M.C., **Técnicas de separación en Química Analítica**, Editorial Síntesis, 2002

Complementary Bibliography

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

Harris, D.C., **Análisis Químico Cuantitativo**, 3º, Reverté, 2007

Miller J.N.; Miller J.C., **Estadística y quimiometría para Química Analítica**, Prentice Hall, 2002

Sánchez Batanero P.; Gómez del Río M.I., **Química Analítica General. Vol.I: Equilibrios en fase homogénea y métodos analíticos.**, Editorial Síntesis, 2006

Silva, M; Barbosa, J., **Equilibrio iónicos y sus aplicaciones analíticas.**, Editorial Síntesis, 2002

Skoog, D.A; West, D.M.; Holler, F.J.; Crouch, S.R., **Fundamentos de Química Analítica**, 8º, Thomson- Paraninfo, 2005

<http://www.scopus.com>, **Base de datos de artículos y trabajos científicos**,

Pawliszyn, J., **Sampling and sample preparation for field and laboratory: fundamentals and new directions in sample preparation**, Elsevier Science B. V., 2002

Rosenfeld, R. M., **Sample preparation for hyphenated analytical techniques**, Blackwell Publishing Ltd., 2004

Mitra, S., **Sample preparation techniques in analytical chemistry**, John Wiley & Sons, 2003

Recommendations

Subjects that continue the syllabus

Instrumental analysis/O01G041V01403

Advanced bromatology/O01G041V01601

Subjects that are recommended to be taken simultaneously

Food chemistry and biochemistry/O01G041V01404

Subjects that it is recommended to have taken before

Chemistry: Chemistry II/O01G041V01203

Chemistry: Chemistry I/O01G041V01103
