



Teaching Guide				
Identifying Data			2023/24	
Subject (*)	Quality in Chemical Laboratories	Code	610509130	
Study programme	Mestrado Universitario en Investigación Química e Química Industrial (Plan 2020)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Optional	3
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Departamento profesorado másterQuímica			
Coordinador	Jimenez Gonzalez, Carlos	E-mail	carlos.jimenez@udc.es	
Lecturers	Buedenber , Larissa Jimenez Gonzalez, Carlos Rodil Rodriguez, Maria Del Rosario Rubí Cano, Elisa M <sup>a</sup>	E-mail	l.buedenber@col.udc.es carlos.jimenez@udc.es	
Web	<a href="https://www.usc.gal/gl/estudios/masteres/ciencias/master-universitario-investigacion-quimica-quimica-industrial/20202021/calidade">https://www.usc.gal/gl/estudios/masteres/ciencias/master-universitario-investigacion-quimica-quimica-industrial/20202021/calidade</a>			
General description	The contents of the subject according to the memory of the master include: advanced notions of quality, general criteria for the accreditation of testing and calibration laboratories according to the UNE-EN-ISO / IEC 17025 standard, metrology: uncertainty and traceability, equipment management, quality assurance of test and calibration results, quality planning, control and management tools and techniques			

Study programme competences / results	
Code	Study programme competences / results
A1	Define concepts, principles, theories and specialized facts of different areas of chemistry.
A2	Suggest alternatives for solving complex chemical problems related to the different areas of chemistry.
A5	Properly assess risks and environmental and socioeconomic impacts associated with special chemicals
A6	Design processes involving the treatment or disposal of hazardous chemicals
A9	Promote innovation and entrepreneurship in the chemical industry and in research.
B5	Students must possess learning skills to allow them to continue studying in a way that will have to be largely self-directed or autonomous.
B6	Innovate in the different areas of chemistry, demonstrating initiative and entrepreneurship
B8	Evaluate responsibility in the management of information and knowledge in the field of Industrial Chemistry and Chemical Research
B9	Demonstrate ability to analyze, describe, organize, plan and manage projects
B10	Use of scientific terminology in English to explain the experimental results in the context of the chemical profession
B11	Apply correctly the new technologies to gather and organize the information to solve problems in the professional activity.
B12	Being able to work in a team and adapt to multidisciplinary teams.
C1	CT1 - Elaborar, escribir e defender publicamente informes de carácter científico e técnico
C2	CT2 - Traballar en equipo e adaptarse a equipos multidisciplinares.
C3	CT3 - Traballar con autonomía e eficiencia na práctica diaria da investigación ou da actividade profesional.
C4	CT4 - Apreciar o valor da calidade e mellora continua, actuando con rigor, responsabilidade e ética profesional.
C5	CT5 - Demostrar unha actitude de respecto polas opinións, valores, comportamentos e prácticas doutros

Learning outcomes	
Learning outcomes	Study programme competences / results



To acquire the aspects related to the quality management in testing and calibration laboratories under the UNE-EN-ISO / IEC 17025 standard, both from a theoretical and practical point of view, with the main objective of guaranteeing Technical competence and reliability of analytical results. To this end, both management requirements and technical requirements that affect quality improvement must be known.	AC1	BC5	CC1
	AC6	BC6	CC2
	AC9	BC10	CC4
		BC12	CC5
To train the students to establish a plan for equipment management, maintenance, verification and writing up the calibration procedures according to the requirements of the UNE-EN-ISO / IEC 17025 standard, with the corresponding calculation of uncertainties.	AC2	BC8	
	AC5	BC9	
To acquire the abilities and skills to validate physical-chemical testing procedures and to get to know the associated uncertainty, in accordance with the requirements of the standard UNE-EN-ISO/IEC 17025		BC11	CC3

Contents	
Topic	Sub-topic
Unit 1. Introduction to quality	
Unit 2. Tools and techniques for quality control and risk management	
Unit 3. Accreditation of analytical laboratories. ISO/IEC 17025	
Unit 4. Metrology and traceability	
Unit 5. Equipment management	
Unit 6. Analytical methodologies and quality	

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Seminar	A2 A9 B6 B8 B9 B10 B11 B12 C1 C3	6	17.5	23.5
Mixed objective/subjective test	B5	1.5	10	11.5
Case study	A5 A6 C4 C5	0	1	1
Oral presentation	B5	1	0	1
Guest lecture / keynote speech	A1 A2 B10	12	24	36
Personalized attention		2	0	2

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

Methodologies	
Methodologies	Description
Seminar	Seminars held with teachers of the Master, or with professionals invited by the company, the administration or other universities. Interactive sessions related to the different subjects with debates and exchange of opinions with students.
Mixed objective/subjective test	Carrying out the different tests for verifying the acquisition of both theoretical and practical knowledge and the acquisition of skills and attitudes
Case study	Resolution of practical exercises (problems, test questions, interpretation and processing of information, evaluation of scientific publications, etc.)
Oral presentation	Oral presentation of papers, reports, etc., including discussion with teachers and students.
Guest lecture / keynote speech	Theoretical classes. Lectures (use of blackboard, computer, cannon), complemented with the tools of virtual teaching

Personalized attention	
Methodologies	Description



Seminar	As tutorías están programadas polo profesor e coordinadas polo Centro. En xeral, cada alumno dispondrá de dúas horas por semestre. As actividades de control como exercicios dirixidos, aclaración de dúbidas sobre a teoría ou dos problemas, exercicios, lecturas ou outras tarefas propostas; ea presentación, presentación, discusión ou comentario feito traballo individual ou en pequenos grupos. En moitos casos, o profesor pode esixir que os estudantes entreguen os exercicios antes da celebración das clases. Estas entregas virán incluído no calendario de actividades a seren desenvolvidas polos alumnos ao longo do curso na Guía docente da disciplina correspondente. Participación nestas clases é obrigatoria.
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Assessment			
Methodologies	Competencies / Results	Description	Qualification
Seminar	A2 A9 B6 B8 B9 B10 B11 B12 C1 C3	Resolución de problemas e casos prácticos, individuais, ou en grupo. Inclúese equi tambén avaliación continua mediante preguntas e cuestións e traballo presencial durante o curso.	20
Mixed objective/subjective test	B5	O exame final incluírá tanto elementos de tipo teórico como de tipo práctico (resolución de casos) asociados ás actividades desenvolvidas nas clases expositivas e nos seminarios.	60
Case study	A5 A6 C4 C5	Realización de traballos e informes escritos	10
Oral presentation	B5	Exposición oral	10

Assessment comments
<p>A avaliación desta materia farase mediante avaliación continua combinada cun exame final.</p> <p>O exame final terá carácter presencial. A data de realización do exame será a quedetermine o centro.</p> <p>Para os casos de realización fraudulenta de exercicios o probas será de aplicación o recollido na ?Normativa de avaliación do rendemento académico dos estudantes e de revisión das cualificacións?</p> <p>A cualificación do/a alumno/a consistirá en dúas partes:- Avaliación continua (40%), que poderá constar á súa vez de:</p> <p>Resolución de problemas e casos prácticos, individuais, ou en grupo 15%</p> <p>Realización de traballos e informes escritos 10%</p> <p>Exposición oral 10%</p> <p>Avaliación continua mediante preguntas e cuestións e traballo presencial durante o curso: 5%</p> <p>- Exame final (60%)</p> <p>O exame final incluírá tanto elementos de tipo teórico como de tipo práctico (resolución de casos) asociados ás actividades desenvolvidas nas clases expositivas e nos seminarios.O criterio para a avaliación como "non presentado" é que o/a alumno/a non se presente ao exame final.Esixírase unha asistencia superior ao 80% do total das clases de carácter obrigatorio (expositivas, seminarios e titorías).</p> <p>É posible que os escenarios cambien ao longo do curso e que se alternen. Sen embargo, o programa da materia e a estrutura dos contidos e actividades non teñen porque verse modificadas por elo, de maneira que a avaliación descrita é válida para calquera dos tres escenarios que se contemplan como posibles ao longo do curso.</p> <p>No caso de que se detecte plaxio, aplicarase a normativa da UDC. Segundo se recolle nas distintas normativas de aplicación para a docencia universitaria, tratarase de incorporar a perspectiva de xénero nesta materia. Traballarase para identificar e modificar prexucios e actitudes sexistas así como situacións de discriminación por razón de xénero e proporanse accións e medidas para corrixilas e fomentar valores de respecto e igualdade</p>

Sources of information
<p><b>Basic</b></p> <p>- Sagrado S., Bonet E., Medina M.J., Martín Y. (2004). Manual Práctico de calidad en los laboratorios. Enfoque ISO 17025. Ediciones AENOR</p> <p>- E. Prichard, V. Barwick (2007). ?Quality Assurance in Analytical Chemistry?. Wiley</p>



<b>Complementary</b>	<ul style="list-style-type: none"><li>- R. Compañó; , A. Ríos (2002). Garantía de la calidad en los laboratorios analíticos. Madrid, Síntesis</li><li>- D.H. Besterfield (2009). Control de calidad (8ª ed). México, Pearson-Prentice Hall</li><li>- J.R. Evans, W. M. Lindsay (2007). Administración y control de la calidad. Wiley</li><li>- Pedro Pablo Morillas Bravo (2018). Guía para la aplicación de UNE-EN ISO/IEC 17025:2017. AENOR ediciones</li><li>- W. Funk, V. Dammann, G. Donnevert (2007). Quality Assurance in Analytical Chemistry. Wiley</li></ul>
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## Recommendations

### Subjects that it is recommended to have taken before

### Subjects that are recommended to be taken simultaneously

Management Systems in the Chemical Industry/610509132

### Subjects that continue the syllabus

Master Thesis/610509139

### Other comments

Basic knowledge of statistics is recommended. To pass the subject is necessary to understand and use the concepts properly. Recommendations for online teaching: Improve the computer and digital competencies by means of the resources available in the UDC

(\*)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.