Teaching Guide

Identifying Data				2018/19
Subject (*)	Chemistry, Information and Society		Code	610G01031
Study programme	Grao en Química			

Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Obligatory	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Química			
Coordinador	Penedo Blanco, Francisco Jose	E-mail	francisco.penedo.blanco@udc.es	
Lecturers	Penedo Blanco, Francisco Jose	E-mail	francisco.penedo.blanco@udc.es	
Web				
General description	In this subject the main aspects related to the Science's development, the scientific information sources, and the Science, Society and Industry relationships are addressed. The key objectives to achieve are the building of a critical and ethical view of scientific work, as well as the comprehension of the everytime strong relationship between Science and Society.			

Study programme competences / results	
Code	Study programme competences / results
A16	Ability to source, assess and apply technical bibliographical information and data relating to chemistry
A18	Risk management in relation to use of chemical substances and laboratory procedures
A21	Understanding of qualitative and quantitative aspects of chemical problems
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
A28	Acquisition, assessment and application of basic principles of industrial activity, organisation and task management
B2	Effective problem solving
B3	Application of logical, critical, creative thinking
B4	Working independently on own initiative
B5	Teamwork and collaboration
B6	Ethical, responsible, civic-minded professionalism
B7	Effective workplace communication
C3	Ability to use basic information and communications technology (ICT) tools for professional purposes and learning throughout life
C4	Self-development as an open, educated, critical, engaged, democratic, socially responsible citizen, equipped to analyse reality, diagnose problems, and formulate and implement informed solutions for the common good
C5	Understanding importance of entrepreneurship, and knowledge of resources available for people with business ideas
C6	Ability to assess critically the knowledge, technology and information available for problem solving
C7	Acceptance as a professional and as a citizen of importance of lifelong learning
C8	Understanding role of research, innovation and technology in socio-economic and cultural development

Learning outcomes			
Learning outcomes	Study programme competences / results		
To know the different ways to obtain information and to communicate research results throughout history and today.	A16 A24 A25 A28	B3 B7	C6

To know the methods of current and past research, and the social and individual environment influences.	A16 A23 A25		C6 C7
To learn the ways to obtain written, audiovisual and online information in Chemistry.	A16 A24 A25 A28	B2 B4	C3
To know and understand the pathways leading to the results in the process of chemical research.	A16 A25 A28	B3 B5 B7	C8
To know, learn and critically evaluate the research ethics. To know and judge the responsible behaviour. To observe and correct mistakes, bad practices and negligence in daily work.	A18 A21 A23 A25 A28	B3 B6 B7	C4 C8
To understand the past and present relationship between Society, Science and Industry, and its strong social influences.	A24 A25 A28	B2 B3 B6 B7	C4 C5 C8

Contents	
Topic	Sub-topic
SECTION I: Origin and development of research and theories	Topic 1. "This is we are" - An Overview of the History of Science and Chemistry Topic 2. Scientific vs Chemical Revolutions. Why did they evolve at a different pace? Topic 3. Methods and Practice in Science
SECTION II: Communication of results	Topic 4. Information Sources Topic 5. Decisions, publication and evaluation of results. Chemical Societies Topic 6. Responsible Science Topic 7. Intellectual property and Patents Topic 8. Science Popularization
SECTION III: Risks and Benefits of Chemistry and Chemical Industry	Topic 9. Evolution of Science-Technology interaction. Topic 10. The Chemical Industry. Will it always be an environmental problem? Topic 11. Scientists and Military Industry, a controversial marriage.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A16 A18 A21 A25 B6 C4 C7 C8	30	30	60
Supervised projects	A16 A18 A21 A23 A24 A28 B2 B3 B5 B7 C5 C6	10	40	50
ICT practicals	A16 B2 B3 B4 C3 C6	4	8	12
Practical test:	A16 B2 B3 C3	2	6	8
Mixed objective/subjective test	A16 A21 A24 A25 B3 B6 C4 C5 C6 C7 C8	3	15	18
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**
Guest lecture / keynote speech	The teacher presents and explains the fundamental concepts of each topic.
Supervised projects	At small group sessions the student will solve the problems proposed by the teacher, who will supervise their work. Case studies linking Chemistry and mass media, health, food, environment, etc., will be discussed. The students must individually submit a final report or perform an oral statement of their work.
ICT practicals	At small group sessions in the Computer classroom, the student will practice the search for specific information in Chemistry, using online bibliographic databases.
Practical test:	A practical exam of searching online bibliographic databases, to evaluate the knowledge acquired in the ICT practicals
Mixed objective/subjective test	A final exam containing multiple choice, short answer and essay questions. Its objective is to assess the knowledge acquired by the students, as well as their critical thinking and their ability to reason, synthetize and create texts.

Personalized attention	
Methodologies	**Description**
Supervised projects	Throughout all sessions of the small group classes, the students' tutoring will be enhanced, helping them to ask and solve doubts. Mandatory personal attention (2 hours) will be scheduled throughout the classes' period via interactive tests, which intend to assess the student's progress to the learning aims of the subject. The student can request individual tutoring at the teacher's office, on the schedule published on the Faculty website. In the specific case of part-time students or exemption of assistance, seminars and supervised work will be led through interactive online support, email or moodle, with a similar schedule to that of small group classes.

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Mixed objective/subjective test	A16 A21 A24 A25 B3 B6 C4 C5 C6 C7 C8	This exam includes multiple choice, short answer and essay questions.	33

Supervised projects	A16 A18 A21 A23 A24 A28 B2 B3 B5 B7 C5 C6	Evaluation is carried out taking into account the following aspects:
		  - Active participation and critical thinking showed throughout the debates in the classroom.
		  - Synthesis and reasoning skills reflected in the works presented.
			34

Practical test:	A16 B2 B3 C3	The evaluation will take into account the accuracy and skill in finding information in bibliographic databases, with a series of exercises to be performed in the Computer classroom.	33

Assessment comments

To pass the course there are two basic requirements:

1) Regular attendance to all evaluable activities; the attendance is compulsory, except for students with part-time or waiver of assistance, as indicated below.

2) To achieve a minimum score of 4.5 (out of 10) in every evaluable activities. If this minimum score is not achieved in any of these activities, the final mark will be Fail (4.0). To pass the subject, the overall rating may not be less than 5 (out of 10).

"Not attended" assessment mark will be applied when the conducted activities add up to less than 33% of the total score.

Only the marks obtained in Seminar and Supervised projects may be retained

for the second opportunity, provided they exceed the minimum of 4.5

previously quoted. Marks falling below implies its corresponding assessment must be repeated. The

 specific retake schedule of these two tests depends on

the number of students who have to attend them, and will be published at the end of the

 first assesment.

The mixed test's mark obtained in the second opportunity will replace the first one's.

Students assessed at the second opportunity may only qualify for Honors mark if

 the maximum number of licenses for the course were not exhausted on the

 first one.

- No mark will be retained for subsequent courses, i.e. the teaching-learning process

including assessment, will start over, which means that the students must

complete all scheduled activities.

Related to the students with part-time or exemption from assistance: all assessed activities can be conducted online, including the practices of

databases search, and ranked as if they were in attendance, so the design of a specific protocol it is not necessary.

Sources of information	
Basic	- P. J. Bowler, I.R. Morus (2007). Panorama general de la ciencia moderna. Editorial Crítica, Madrid - Committee on Science, Engineering and Public Policy (EEUU) (1992). Responsible Science: Ensuring the Integrity of the Research Procces, vol.1.. National Academic Press, Washington - Committee on Science, Engineering and Public Policy (EEUU) (1995). On Being a Scientist. National Academy Press - David C. Lindberg. (2002). Los inicios de la ciencia occidental . Editorial Paidós, Barcelona - W.H. Brock (1998). Historia de la química, serie: Ciencia y Tecnología . Editorial Alianza Editorial, 1998, Madrid - A.F. Chalmers (1993). ¿Qué es cosa llamada ciencia?. Siglo XXI, Madrid - Patricia Fara (2009). Breve historia de la ciencia . Editorial Ariel, Barcelona Páxinas web de utilidade:- http://www.udc.es/biblioteca- http://echa.europa.eu/- http://ec.europa.eu/index_es.htm- http://www.epo.org
Complementary	

Recommendations	
Subjects that it is recommended to have taken before	
Subjects that are recommended to be taken simultaneously	
Subjects that continue the syllabus	
Other comments	

- For non English-speaking students: IT IS RECOMMENDED TO HAVE A MEDIUM OR ADVANCED LEVEL OF COMPREHENSION OF ENGLISH TEXTS.- Writing skills using common computer tools are needed. Additionally, it's very important to have at least an intermediate skill level using a portable slideshow application, such as Microsoft PowerPoint or
OpenOffice Impress.