Teaching Guide				
Identifying Data				2021/22
Subject (*)	Industrial Safety		Code	610509131
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	Química			
Coordinador	Riveiros Santiago, Ricardo	E-mail	ricardo.riveiros@udc.es	
Lecturers	Riveiros Santiago, Ricardo	E-mail	ricardo.riveiros@udc.es	
Web	https://www.usc.gal/gl/estudos/masteres/ciencias/master-universitario-investigacion-quimica-quimica-industrial			
General description	A industria química está suxeita a unha estricta lexislación en materia de seguridade laboral. Por iso o profesional da química debe de coñecer todos aqueles aspectos que poden dar lugar a situación de risco no solo para as persoas si non, tamén, para os bens e o medioambiente. A seguridade das persoas, dos traballadores e do medioambiente son fundamentáis, hoxe en día, e cada vez máis nas empresas. A xestión da seguridade industrial evita grandes gastos nas empresas xa que as catástrofes xeradas por unha inadecuada xestión se resolven pola vía do código civil e evita que os profesionais se teñan que enfrontar á vía do código penal. Ademas, de xerar unha mala imaxe das empresas na sociedade.			
Contingency plan	Scenario 1: adapted normality (without restrictions to physical presence) ? The expository and interactive teaching will be fundamentally face-to-face, although exceptionally and Justified, telematic teaching may be combined with face-to-face teaching up to a maximum of 10% of the hours of the subject, and in the case of practical teaching carried out by telematic means, up to 25% may be reached. ? The tutorials will be essentially face-to-face, although they may be carried out partially virtually. ? The final tests will be face-to-face. Scenario 2: distancing (with partial restrictions on physical presence). ? The expository teaching may be carried out in two modalities, entirely in person (for groups reduced), or combined with 50% physical presence and 50% telematics, in those teaching spaces in which the distancing possible. In interactive teaching, seminars and laboratories, it is possible to combine the presence physics and telematics, up to a maximum of 50% of the hours of the matter in a telematic way, when the distancing so require it. ? The tutorials will be face-to-face in their entirety (if distance is possible) or combined 50% with telematic classes (if presence is not possible). ? The final tests will be preferably face-to-face Scenario 3: closure of the facilities (impossibility of teaching face-to-face). ? Teaching will be completely telematic in nature, with synchronous mechanisms. ? The tutorials will be exclusively online. ? The final tests will be exclusively telematic. In general, in the three scenarios, for the development of thematic teaching, the MS tools will be used. Teams and Moodle. In cases of fraudulent performance of exercises or tests, the provisions of the "Regulations for evaluation of students' academic performance and review of grades ".			

Study programme competences	
Code	Study programme competences
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.
B1	Possess knowledge and understanding to provide a basis or opportunity for originality in developing and / or applying ideas, often within a research context
B4	Students should be able to communicate their conclusions, and the knowledge and the reasons that support them to specialists and non-specialists in a clear and unambiguous manner
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.
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
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.

Learning outcomes			
Learning outcomes	Study programme competences		
To form and provide tools to understand the risks of chemicals and their reactions.	AC2 AC5	BC1 BC4 BC10 BC11 BC12	CC1 CC3 CC4
To learn how to evaluate and manage the risks associated with chemicals.	AC2 AC5 AC6 AC9	BC1 BC4 BC5 BC9 BC10 BC11 BC12	CC1 CC3 CC4
To know the complex legal regulations associated with the chemical sector (Seveso Directive, REACH regulation, transport of chemical products, prevention of occupational risks, self-protection plans, etc.).	AC2 AC5 AC6 AC9	BC1 BC4 BC5 BC9 BC10 BC11 BC12	CC1 CC3 CC4
Adquirir os coñecementos precisos para adaptar a realidade das plantas químicas a normativa legal, para permitir minimizar os accidentes laborais, aos bens da empresa e as entidades próximas a planta química.	AC2 AC5 AC6 AC9	BC1 BC4 BC5 BC9 BC10 BC11 BC12	CC1 CC3 CC4

Contents	
Topic	Sub-topic
Chapter 1. Chemical products.	? Introduction. ? Typology of risks associated with chemicals. ? Analysis methodology to determine risks.

Chapter 2. Typology of accidents associated with chemicals.	? Fires. ? Explosions ? Spills. ? Leaks.
Chapter 3. Risks for the persons, industrial risks and environmental risks.	? Typology of risks. ? Industrial activities at risk. ? Typology of accidents. ? The regulations: UN, European, national.
Chapter 4. Risk assessment.	? Typology of risk assessments: People, Industrial and Environmental. ? Typology of Methods. ? Software.
Chapter 5. Precautionary measures.	? Typology of Precautionary measures. ? Legislative requirements.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 A2 A5 A6 A9 B1 B4 B5 B9 B10 B11 B12	12	28	40
Seminar	B1 B4 B9 B10 B11 B12	9	18	27
Objective test	B1 B5 B12	2	4	6
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	Twelve full group class sessions by videoconference are scheduled. The students will have access to the different materials through the Moodle platform of the UDC.
Seminar	During the seminar classes, exercises and case studies will be discussed. The student should also develop different papers and written reports and present them orally.
Objective test	The objective test will consist of theoretical, practical and/or theoretical-practical questions about all the contents of the subject.

Personalized attention	
Methodologies	Description
Seminar	Students with appreciation a part-time academic and attendance waiver of exemption may complete the seminars in individual and/or group tutoring schedule to be agreed with the teachers. The activities undertaken in these tutorials will be similar to those of students in ordinary regime and consideration for the final assessment.

Assessment			
Methodologies	Competencies	Description	Qualification
Seminar	B1 B4 B9 B10 B11 B12	Ongoing evaluation will be the 45% of the final mark and will consist of the following parts: Problem solving and case studies (15%), writing reports (10%), oral presentations (papers, 10%) and evaluation through oral questions and questions during the course (10%).	45
Objective test	B1 B5 B12	The objective test will consist of theoretical, practical and/or theoretical-practical questions about all the contents of the subject.	55

Assessment comments
Taking into account that, in the industry, the development of writing reports and oral presentations is important, it will be valued: - Clarity. - Non-spelling errors. - Quick response of the writing reports to be presented by the student. In the case of students with recognition of part-time dedication and academic assistance waiver, the qualification of the seminars will be replaced by that obtained in the personal tutorials. Students who attend fewer than 25% of planned academic activities and do not assist to the objective test, will be qualified as "Not presented".

Sources of information	
Basic	- Storch de Gracia, J. M. (). Manual de seguridad industrial en plantas químicas y petroleras. McGraw-Hill - Carl Roth, Ed (). Manual de seguridad en el laboratorio. - Storch de Gracia, J. M.; García Martín, T. (). Seguridad industrial en plantas químicas y energéticas. Fundamentos, evaluación de riesgos y diseño.. Madrid: Díaz de Santos
Complementary	- (). R.D. 840/2015 de 21 de septiembre. B.O.E. - (). Normativa A.D.R.. - (). R.D. 379/2001 de 6 de abril. B.O.E. - (). R.D. 130/2017 de 24 de febrero. B.O.E. - U.S. Environmental Protection Agency (). Manual para usuarios del programa ALOHA (Areal Locations Of Hazardous Atmospheres). - (). Reglamento REACH. - (). Reglamento CLP.

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Industrial Legislation/610509133 Management Systems in the Chemical Industry/610509132 Industrial Chemistry: Process control/610509129 Economics and Business/610509134
Subjects that continue the syllabus
Other comments
This guide is a transcriptio of the original that can be downloaded from the website of the master:https://www.usc.gal/gl/estudos/masteres/ciencias/master-universitario-investigacion-quimica-quimica-industrial