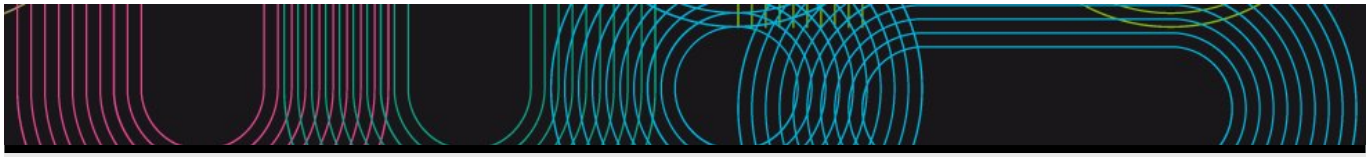

IDENTIFYING DATA				
Industrial Chemistry				
Subject	Industrial Chemistry			
Code	V11G201V01408			
Study programme	Grado en Química			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	#EnglishFriendly Spanish Galician			
Department				
Coordinator	Rosales Villanueva, Emilio			
Lecturers	Fernández Sanromán, Antía Rosales Villanueva, Emilio			
E-mail	emiliorv@uvigo.es			
Web				
General description	The chemical industry represents one of the most thriving sectors in the economies of many countries, serving as the basis for producing a wide variety of products that range from materials for general use, to materials with a high technological content and cutting-edge for other industries. Recent advances in obtaining new products together with new technologies to remedy environmental damage and increase productivity arise from innovations and continuous improvement developed in each of the stages of chemical processes. This subject aims to provide students with a global vision of Industrial Chemistry, ranging from the development and understanding of flow diagrams of chemical processes of great economic and social relevance to the quality principles that govern them. English Friendly subject: 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.			

Training and Learning Results	
Code	
A3	Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues
C45	Apply chemical and chemical engineering knowledge to industrial processes
D1	Ability to solve problems
D2	Capacity for teamwork
D3	Ability to communicate in both oral and written form in Spanish and / or Galician and / or English

Expected results from this subject	Training and Learning Results		
Appreciate the importance and complexity of the industrial chemical processes.	A3	C45	D1
Describe the main stages of an industrial chemical process and elaborate flow diagrams of simple processes.	A3	C45	D1 D2 D3
Identify the main raw materials used in the chemical industry and their characteristics.	A3	C45	D1 D2
Compare the diverse sources of energy used in the industry and make simple studies of energetic integration.	A3	C45	D1 D2
Describe the industrial chemical processes more usual in diverse productive sectors.	A3	C45	D2 D3

Contents
Topic

General appearances of the Industrial Chemistry.	Introduction to the processes of the Chemical Industry. Characteristics and sectorial structure of the chemical industry. Situation of the chemical industry Spaniard in the European and world-wide context. Introduction to the diagrams of flow for processes of industrial chemistry
Raw materials used in the chemical industry	Classification and typology. Sources. Circular economy.
The energy in the chemical industry	General characteristics. Sources of traditional and alternative energy. Energetic integration.
Industrial chemical processes	Petrochemical, biotechnological processes and other productive processes for raw materials transformation.

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	12	24	36
Problem solving	16	25	41
Seminars	3	9	12
Mentored work	4	30	34
Presentation	1	4	5
Laboratory practical	14	5	19
Essay questions exam	1	0	1
Objective questions exam	0.5	0.5	1
Oral exam	0.5	0.5	1
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Lecturing	Presentation by the teacher of the general aspects of the programme in a structured way, with special emphasis on the fundamentals and the most important or difficult aspects for the student to understand. The professor will facilitate, through the platform MOOVI, the necessary material for a correct follow-up of the matter. The student will have to work previously the material delivered by the professor and consult the bibliography recommended to complete the information.
Problem solving	During the development of the subject will use the resolution of questions and problems so as to reinforce the appearances presented in the lectures.
Seminars	With the development of the syllabus, some activities focused to the work on a specific subject will be made, that will allow to deepen and complement the contents of the subject as it complement of the lecturing.
Mentored work	Inside the problem solving, the students working in groups will develop a work that will be based in the search of solutions for real problems where the students will have to provide a feasible and viable solution to proposed problem.
Presentation	The students will make by group a short presentation of the mentored work with the solution proposed for the problem assigned.
Laboratory practical	Laboratory experiments and field trips to companies related to subject will be carried out. The student will be provided with practice guide as well as the necessary support material for a proper understanding of the experiments to be carried out. The student will prepare a final report in which the main results and conclusions will be presented.

Personalized assistance	
Methodologies	**Description**
Lecturing	During the hours of tutorship the students, individually or in group, can consult with the lecturers any doubt posed on the subject. The lecturer will inform on the available schedule in the presentation of the subject.
Problem solving	During the hours of tutorship the students, individually or in group, can consult with the lecturers any doubt posed on the problem solving. The lecturer will inform on the available schedule in the presentation of the subject.
Laboratory practical	During the hours of tutorship the students, individually or in group, can consult with the lecturers any doubt posed on the laboratory practical. The lecturer will inform on the available schedule in the presentation of the subject.
Seminars	During the hours of tutorship the students, individually or in group, can consult with the lecturers any doubt posed on the seminars. The lecturer will inform on the available schedule in the presentation of the subject.
Mentored work	During the hours of tutorship the students, in groups or their members of individual way, can consult with the lecturer any doubt posed on the development of the work. The lecturer will inform on the available schedule in the presentation of the matter.

Presentation	During the hours of tutorship the students, in groups or their members of individual way, can consult with the lecturer any doubt posed on the presentation. The lecturer will inform on the available schedule in the presentation of the matter

Assessment

	Description	Qualification	Training and Learning Results		
Problem solving	After each subject will argue the most notable appearances by means of resolution of questions and problems	10	A3	C45	D1 D2 D3
Mentored work	It will be evaluated the solution presented together with structure of contents, quality of the content, sources consulted, format.	10	A3	C45	D1 D2 D3
Presentation	The sudent will present the mentored work for its discussion with the other students of the matter. It will be evaluated the oral presentation as well as the answers to the lecturer and the other students.	10	A3	C45	D1 D2 D3
Laboratory practical	The students will make diverse practices of laboratory and visits to companies. When finalising the diverse practical and in the dates indicated by the professors , they will have to deliver the reports of practices and make a questionnaire on the company visits.	10	A3	C45	D1 D2 D3
Essay questions exam	A global exam of for the evaluation of the acquired knowledge in the subject will be assessed.	25	A3	C45	D1 D3
Objective questions exam	In the final exam the student will have to answer a series of short questions or multiple-choice questions in which they will have to demonstrate their knowledge as well as their capacity for synthesis.	25	A3	C45	D3
Oral exam	There will be an individual oral examination of the laboratory practicals carried out in the course.	10	A3	C45	D3

Other comments on the Evaluation

ASSESSMENT: The participation of the student in any of the systems of evaluation of the subject (problem solving, mentored work , presentation and laboratory practical) will involve the qualificationof the subject. It is required a minimum attendance to 90% of the laboratory practical to have right to its evaluation. Otherwise, the mark for this section will be 0.0 and they will have to take an exam in the FINAL EXAM.The evaluation by both essay and objective questions (50%) will be carried out in several exams along the course. If the students fail to pass the exam, they have to recover it in the FINAL EXAM.

A student who do not "officially renounces to continuous assessment", will fail if he/she does not achieve a MINIMUM mark of 4.0 points (out of 10) in each of the parts of the "FINAL EXAMINATION". If the minimum mark in the "FINAL EXAMINATION" is passed, the student will pass the course if the FINAL GRADE is ≥ 5.0, that is, if the sum of the marks obtained in the different systems of evaluation of the course is ≥ 5.0.

Second call: The same criteria will be applied in the second sitting. With regard to the July exam, the grade of the different assessment systems (laboratory practicals, problem solving and exercises) will be maintained, so students will only take the "FINAL EXAM".

STUDENTS RELEASED FROM CONTINUOUS ASSESSMENT: When the School releases a student from the continuous assessment process, his/her grade will be the sum of 90% of the mark obtained in the "FINAL EXAM" and 10% of the laboratory practicals mark.**ETHICAL COMMITMENT:The student is expected to show appropriate ethical behaviour. If ethically reprehensible behaviour is detected (for example: copying, plagiarism, use of unauthorised electronic devices, etc.) the student will not be considered to meet the necessary requirements to pass the subject. In this case the overall grade for the current academic year will be a fail (0.0). The use of any electronic device will not be permitted during the assessment tests unless expressly authorised. Bringing an unauthorised electronic device into the examination room will be considered as a reason for failing the subject in the current academic year and the overall grade will be a fail (0.0).**

Sources of information

Basic Bibliography

Vián Ortuño, A., **Introducción a la Química Industrial**, 2ª, Reverté, 1994

Sinnott, R.K., **Diseño en ingeniería química**, 5ª, Reverté, 2012

Díaz, M., **Ingeniería de bioprocesos**, Paraninfo, 2012

Wauquier, J.-P., **El refino del petróleo**, 1ª, Dias de Santos, 2004

De Juana, J.M., **Energías renovables para el desarrollo**, 1ª, Thomson Paraninfo, 2003

Complementary Bibliography

Turton, R., **Analysis, synthesis, and design of chemical processes**, 2ª, Pearson education, 2013

Federación Empresarial de la Industria Química Española, **Radiografía del sector químico español 2022**, FEIQUE, 2022

Recommendations

Subjects that it is recommended to have taken before

Chemical engineering/V11G201V01301