



## Teaching Guide

Identifying Data					2023/24
Subject (*)	Chemical Process Engineering	Code	730497204		
Study programme	Mestrado Universitario en Enxeñaría Industrial (plan 2018)				
Descriptors					
Cycle	Period	Year	Type	Credits	
Official Master's Degree	2nd four-month period	First	Optional	4.5	
Language	SpanishGalician				
Teaching method	Face-to-face				
Prerequisites					
Department	Química				
Coordinador	Ruiz Bolaños, Isabel	E-mail	isabel.ruiz@udc.es		
Lecturers	Ruiz Bolaños, Isabel	E-mail	isabel.ruiz@udc.es		
Web					
General description	O obxecto desta materia é abordar o estudo de procesos da industria química nos que se obteñen produtos básicos (ácidos, bases, fertilizantes, deterxentes, derivados do petróleo, etc.), analizando as materias primas, as etapas do proceso e os impactos que xenera.				

## Study programme competences / results

Code	Study programme competences / results
A4	ETI4 - Capacity for the analysis and design of chemical processes.
A5	ETI5 - Knowledge and skills for the design and analysis of machines and thermal engines, hydraulic machines and industrial installations of heat and cold.
B2	CB7 - That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
B3	CB8 - That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
B4	CB9 - That the students know how to communicate their conclusions -and the knowledge and ultimate reasons that sustain them- to specialized and non-specialized audiences in a clear and unambiguous way.
B6	G1 - Have adequate knowledge of the scientific and technological aspects in Industrial Engineering.
B7	G2 - Project, calculate and design products, processes, facilities and plants.
B13	G8 - Apply the knowledge acquired and solve problems in new or unfamiliar environments within broader and multidisciplinary contexts.
B14	G9 - Be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments.
B15	G10 - Knowing how to communicate the conclusions -and the knowledge and ultimate reasons that sustain them- to specialized and non-specialized publics in a clear and unambiguous way.
C1	ABET (a) - An ability to apply knowledge of mathematics, science, and engineering.
C3	ABET (c) - An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
C5	ABET (e) - An ability to identify, formulate, and solve engineering problems.
C6	ABET (f) - An understanding of professional and ethical responsibility.
C7	ABET (g) - An ability to communicate effectively.
C8	ABET (h) - The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
C11	ABET (k) - An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## Learning outcomes



Learning outcomes	Study programme competences / results		
<p>Conseguir a adecuación do produto ás esixencias do mercado, así como as normas de ensaio e especificacións de produtos.</p> <p>Ser capaz de entender o proxecto dun proceso químico: consumos e condicións de operación, así como a súa viabilidade técnica.</p> <p>Seguridade básica na industria química.</p> <p>Coñecer os distintos procesos químicos industriais.</p>	AJ4 AJ5	BJ3 BJ6 BJ14	CJ1 CJ8
Identificar as diferentes etapas dun proceso no diagramas de fluxo e ser capaz de realizar calculos básicos no deseño de procesos químicos.	AJ4	BJ2 BJ7 BJ13	CJ1 CJ3 CJ5
Ser capaz de elaborar información relacionada cos procesos químicos e transmitila de forma coherente.	AJ4	BJ4 BJ15	CJ6 CJ7 CJ11

Contents	
Topic	Sub-topic
Tema inicial: Os bloques ou temas seguintes desenvolven os contidos establecidos na ficha da Memoria de Verificación, que son:	<p>Análise e deseño de procesos químicos.</p> <ul style="list-style-type: none"> <li>- Materias primas e produtos básicos.</li> <li>- Deseño e desenvolvemento de procesos na industria química.</li> </ul>
1. Introducción á Industria Química	<ul style="list-style-type: none"> <li>- Principais sectores da Industria Química</li> <li>- Materias primas e produtos</li> </ul>
2. Etapas no deseño dun proceso químico	<ul style="list-style-type: none"> <li>- Diagramas de fluxo</li> <li>- Balances de materia</li> <li>- Balances de enerxía</li> <li>- Unidades de operación e separación</li> <li>- Análise do ciclo de vida</li> </ul>
3. Estudo de procesos da química básica	<ul style="list-style-type: none"> <li>- Obtención de ácidos e bases</li> <li>- Petroleoquímica</li> <li>- Fertilizantes</li> <li>- Polímeros</li> <li>- Biomasa</li> </ul>

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A4 A5 B3 B14 B6 C1 C8	13	19.5	32.5
Problem solving	A4 B2 B7 C5	14	21	35
Supervised projects	B4 B13 B15 C3 C6 C7 C11	14	21	35
Objective test	A4 B3 B6	3	6	9
Personalized attention		1	0	1

(\*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	Exposición dos aspectos básicos dos temas por parte do profesorado, con apoio de presentacións e material de lectura recomendado.



Problem solving	Os exercicios propostos nos boletíns se resolverán na aula de forma participativa.
Supervised projects	O estudo dalgúns procesos químicos concretos abordaráse na aula mediante dinámicas de traballo en grupo.
Objective test	Consistirá en preguntas cortas e exercicios relacionados cos contidos desenvolvidos.

### Personalized attention

Methodologies	Description
Supervised projects	O alumnado con dispensa académica poderá realizar o traballo titorizado de forma individual, para o que se contempla a atención personalizada.

### Assessment

Methodologies	Competencies / Results	Description	Qualification
Supervised projects	B4 B13 B15 C3 C6 C7 C11	De cada proceso que se traballe na aula os grupos realizarán un breve informe no que se recollan os aspectos fundamentais do proceso químico abordado. Estes informes serán entregados e avaliados.	30
Problem solving	A4 B2 B7 C5	Programaranse 2 sesións de seminario nas que os exercicios serán entregados para a súa corrección e formarán parte da avaliación.	20
Objective test	A4 B3 B6	Para superar a materia haberá que acadar un mínimo de 4,5 sobre 10 na proba obxectiva.	50

### Assessment comments

O alumnado con dispensa académica poderá realizar un traballo de forma individual. Na segunda oportunidade manteránse as cualificacións obtidas na avaliación continua (seminarios e traballos). Os criterios de avaliación na convocatoria adiantada de decembro serán os mesmos que na segunda oportunidade do curso anterior.

### Sources of information

<b>Basic</b>	<ul style="list-style-type: none"><li>- R.M. Murphy (2007). Introducción a los procesos químicos. Principios, análisis y síntesis.. MacGraw-Hill</li><li>- M.J. Caselles Pomares (2004). Química aplicada a la ingeniería. UNED</li><li>- A. Vian (1998). Introducción a la química industrial. Reverté</li><li>- J.F. Izquierdo (2011). Introducción a la Ingeniería Química: Problemas resueltos de balances de materia y energía. Reverté</li><li>- M. Martín Martín (2016). Industrial chemical process analysis and design. Elsevier</li><li>- Seider, W.D.; Seader, J.D.; Lewin, D.R. (2003). Product &amp; Process Design Principles. Synthesis, Analysis and Evaluation. Wiley</li></ul>
<b>Complementary</b>	

### 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

Para axudar a conseguir un entorno inmediato sostenido e cumprir co obxectivo da acción número 5: "Docencia e investigación saudable e sustentable ambiental e social" do "Plan de Acción Green Campus Ferrol": A entrega dos traballos documentais que se realicen nesta materia serán en formato virtual e/ou soporte informático e se entregarán a través do Campus Virtual sen necesidade de imprimilos.



(\*)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.