



Teaching Guide				
Identifying Data			2020/21	
Subject (*)	Chemical Technology	Code	610G01041	
Study programme	Grao en Química			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Fourth	Optional	4.5
Language	Galician			
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	The main objective of the course is to provide the students with basic knowledge of environmental engineering. It introduces the most important processes used in water treatment and recovery, waste gas treatment and waste treatment and disposal.			
Contingency plan	1. Modifications to the contents  2. Methodologies *Teaching methodologies that are maintained  *Teaching methodologies that are modified  3. Mechanisms for personalized attention to students  4. Modifications in the evaluation  *Evaluation observations:  5. Modifications to the bibliography or webgraphy			

Study programme competences / results	
Code	Study programme competences / results
A7	Knowledge and application of analytical methods
A10	Knowledge of chemical kinetics, catalysis and reaction mechanisms
A11	Knowledge and design of unit operations in chemical engineering
A13	Understanding of chemistry of main biological processes
A14	Ability to demonstrate knowledge and understanding of concepts, principles and theories in chemistry
A15	Ability to recognise and analyse new problems and develop solution strategies
A16	Ability to source, assess and apply technical bibliographical information and data relating to chemistry
A19	Ability to follow standard procedures and handle scientific equipment
A20	Ability to interpret data resulting from laboratory observation and measurement
A21	Understanding of qualitative and quantitative aspects of chemical problems
A22	Ability to plan, design and develop projects and experiments
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
B1	Learning to learn



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
C2	Oral and written proficiency in a foreign language
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
C8	Understanding role of research, innovation and technology in socio-economic and cultural development

Learning outcomes			
Learning outcomes	Study programme competences / results		
To apply the knowledge of Chemistry to the identification of the main environmental problems that concern wastewater, gaseous effluents and solid waste.	A10 A13 A14 A16 A24 A25 A28	B1 B3 B7	
To know the available technologies to address water and atmosphere pollution and the management of solid waste.	A7 A11 A13 A14 A15 A16 A24 A25 A28	B1 B2 B3 B4 B5 B6 B7	C2 C5 C6 C8
To perform simple techniques for characterizing contaminated effluents.	A7 A19 A20 A21 A22		

Contents	
Topic	Sub-topic
Chapter 1. Introduction to environmental engineering.	Overview of the environmental problems and their management.
Chapter 2. Wastewater treatment.	Introduction. Physical treatment processes. Biological treatment processes and technologies.
Chapter 3. Treatment of gaseous effluents.	Introduction. Systems for pollution abatement. Treatment technologies to treat contaminated gases and vapors.
Chapter 4. Waste valorisation and treatment.	Introduction. Types of Waste. Waste valorization and management. Waste treatment technologies.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours



Guest lecture / keynote speech	A7 A10 A13 A14 A19 A21 A25 A28 C2 C8	14	28	42
Problem solving	A7 A11 A13 A14 A15 A16 A20 A21 A25 B1 B3 B4 B5 C2	10	25	35
Supervised projects	A14 A16 A20 A21 A22 A24 B6 C8 C5 C2	2	20	22
Oral presentation	A14 A16 A24 B7	2	6	8
Mixed objective/subjective test	A13 A14 A16 A24 B2 B3 B7 C6	2	4	6
Personalized attention		0	0	0

(\*)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	Classes with the theoretical content of the subject.
Problem solving	These sessions will address the resolution of practical exercises related to the design of some of the equipment used in pollutant treatment.
Supervised projects	Cada alumno/a realizará un traballo profundizando nalgún aspecto dun dos temas que se abordarán nas sesións maxistras.
Oral presentation	O/A alumno/a realizará unha presentación en 15 min. do traballo realizado.
Mixed objective/subjective test	A final written exam to assess the knowledge acquired by the student will be held at the end of the course.

Personalized attention	
Methodologies	Description
	<p>The teacher will help the student with the doubts that may arise in performing the activities entrusted to it. It will take place in the timetable available to the teacher.</p> <p>In the case of justified exceptional circumstances, additional measures may be taken so that the student can pass the subject, such as flexibility in the delivery date of supervised projects and in practice schedules.</p>

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Problem solving	A7 A11 A13 A14 A15 A16 A20 A21 A25 B1 B3 B4 B5 C2	Students will be asked to do and hand some of the proposed exercises to its evaluation.	15
Supervised projects	A14 A16 A20 A21 A22 A24 B6 C8 C5 C2	O/A alumno/a realizará o traballo a partir de 3-5 artigos de investigación relacionados co temario.	25
Oral presentation	A14 A16 A24 B7	O/A alumno/a realizará unha presentación oral do seu traballo, que terá unha duración aprox. de 15 min.	10
Mixed objective/subjective test	A13 A14 A16 A24 B2 B3 B7 C6	Students must to do a final written test that will assess the acquired knowledge.	50



## Assessment comments

To pass the subject, it is required at least a score of 4 (out of 10) in each of the assessment activities, and a global average score equal to or greater than 5 (out of 10). Even if the global grade is equal or greater than 5, if a student does not get the minimum score in any of the activities, the final mark will be 4,5 (fail).

In the second opportunity (July) only it's possible to improve the score in the test.

Only the students who did not do any of the assessment activities will be considered as "not presented".

Honor marks will be given priority in the first opportunity (June), in the second opportunity (July) they may only be granted if have not been exhausted in June.

The teaching-learning process, including assessment, refers to an academic course and, therefore, will restart as new with every academic year, including all activities and assessment procedures scheduled for that course.

In the case of justified circumstances, additional measures may be taken so that the student can pass the subject, such as flexibility in the delivery date of exercises and in practice schedules.

## Sources of information

<b>Basic</b>	<ul style="list-style-type: none"> <li>- Davis e Masten (2005). Ingeniería y ciencias ambientales. McGraw-Hill</li> <li>- Metcalf and Eddy (1995). Ingeniería de Aguas Residuales. Tratamiento, vertido y reutilización.. Labor.</li> <li>- Henze, M. et al. (2008). Biological Wastewater Treatment. IWA Publishing</li> <li>- Kennes, C. and Veiga, M.C. (2001). Bioreactors for waste gas treatment. Kluwer Academic Publishers</li> <li>- Deublein, D. and Steinhauser, A. (2008). Biogas from waste and renewable resources: an introduction. Wiley-VCH</li> </ul>
<b>Complementary</b>	

## Recommendations

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

Chemical Engineering/610G01033

### Subjects that are recommended to be taken simultaneously

### Subjects that continue the syllabus

### Other comments

(\*)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.