



Teaching Guide				
Identifying Data				2013/14
Subject (*)	Tecnoloxía Química	Code	610G01041	
Study programme	Grao en Química			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Fourth	Optativa	4.5
Language	Spanish			
Prerequisites				
Department	Química Física e Enxeñaría Química 1			
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Web				
General description	La materia ?Tecnología Química? es una asignatura optativa que se imparte en el último curso del Grado de Química. El objetivo fundamental es aportar al alumno los conocimientos básicos de la Ingeniería Ambiental. Se introducen los distintos procesos empleados en el tratamiento y valorización de aguas, efluentes gaseosos y residuos, así como recuperación de suelos contaminados. Los conceptos teóricos adquiridos se pondrán en práctica en el laboratorio, y para que el alumno se familiarice con los equipos y procesos se realizarán visitas a instalaciones a escala industrial.			

Study programme competences	
Code	Study programme competences
A7	Coñecer e aplicar as técnicas analíticas.
A11	Coñecer e deseñar operacións unitarias de Enxeñaría Química.
A13	Comprender a Química dos principais procesos biolóxicos.
A14	Demostrar o coñecemento e comprensión de conceptos, principios e teorías relacionadas coa Química.
A15	Recoñecer e analizar novos problemas e planear estratexias para solucionarlos.
A19	Levar a cabo procedementos estándares e manexar a instrumentación científica.
A20	Interpretar os datos procedentes de observacións e medidas no laboratorio.
A22	Planificar, deseñar e desenvolver proxectos e experimentos.
A24	Explicar, de xeito comprensible, fenómenos e procesos relacionados coa Química.
A25	Relacionar a Química con outras disciplinas e recoñecer e valorar os procesos químicos na vida diaria.
B2	Resolver problemas de forma efectiva.
B3	Aplicar un pensamento crítico, lóxico e creativo.
B4	Traballar de forma autónoma con iniciativa.
B5	Traballar de forma colaborativa.
C2	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes			
Subject competencies (Learning outcomes)			Study programme competences
To know and design unit operations in environmental engineering.			A11   B3   C8



To understand the design and operation of chemical and biological reactors.	A13 A19 A20 A25		C8
To know and apply the techniques of detection and treatment of environmental pollution.	A11 A15 A20 A25	B2 B5	C2 C3
To know the problems of water pollution and the technologies available to treat it.	A7 A11 A19 A22 A24 A25	B3 B4 B5	C6 C8
To know the problems of air pollution and the technologies available to treat it.	A7 A11 A13 A14 A19 A22 A24 A25	B3 B4 B5	C6 C8
To know and apply bioremediation techniques and bioremediation of contaminated environments.	A7 A11 A13 A14 A19 A22 A24 A25	B3 B4 B5	C6 C8

Contents	
Topic	Sub-topic
Chapter 1. Introduction to environmental engineering.	Introduction.
Chapter 2. Unit operations in environmental technology.	Equilibrium stage processes
Chapter 3. Reactors.	Introduction. Reactor design. Reactor types. Bioreactors.
Chapter 4. Water treatment.	Introduction. Physical treatment processes. Biological treatment processes and technologies. Water purification. Regeneration of water. Sludge management.
Chapter 5. Treatment of gaseous effluents.	Introduction. Systems for pollution abatement. Treatment technologies to treat contaminated gases and vapors.
Chapter 6. Waste valorisation and treatment.	Introduction. Types of Waste. Waste valorization and management. Waste treatment technologies.
Chapter 7. Contaminated soil remediation.	Introduction. Techniques pollution containment. Confinement techniques. Decontamination techniques.

Planning			
Methodologies / tests	Ordinary class hours	Student's personal work hours	Total hours
Guest lecture / keynote speech	14	28	42
Seminar	7	17.5	24.5



Laboratory practice	6	9	15
Field trip	6	6	12
Supervised projects	3	12	15
Mixed objective/subjective test	3	0	3
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	Lectures with the basic content of the subject.
Seminar	Practical problems related to the given lectures will be developed. This activity will take place in small groups.
Laboratory practice	Laboratory experiments to apply the acquired theoretical knowledge to practice. Acquisition of the basic skills and procedures related to the subject under study.
Field trip	Several training visits to companies that have facilities related to the contents of the subject will be done. Each individual student should prepare a report to be delivered to the teacher. It is a mandatory activity.
Supervised projects	Homework to be prepared in a small group of students on a topic related to the subject content. It will have a submission deadline. A written report will be given to the teacher and will be presented orally in class.
Mixed objective/subjective test	A final written exam to assess the knowledge acquired by the student will be held at the end of the semester.

Personalized attention	
Methodologies	Description
Laboratory practice Seminar	<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 of tutorials available to the teacher.</p> <p>During the lab sessions the students will have personalized attention from the teacher. At the beginning they will discuss the preparation of the experiment, while running it the student will receive the necessary support, and at the end they will comment on the results obtained.</p>

Assessment		
Methodologies	Description	Qualification
Supervised projects	The quality of the report will be assessed in terms of content and references. Both the submitted written report and oral presentation will contribute to the assessment.	10
Laboratory practice	A continuous assessment in the experimental work. The report with the results and discussion will be assessed.	10
Mixed objective/subjective test	Final written exam that will assess the knowledge acquired at the end of the semester.	55
Field trip	Each student should prepare a report on the facilities visited in the company, and deliver it to the teacher. It is a mandatory activity.	10
Seminar	The resolution of exercises will be assessed. The active participation will be assessed in classroom activities.	15

Assessment comments
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- Attendance to all the laboratory and field trip activities is mandatory. At least, a grade of four out of ten in each of these activities is required. If the average is equal to or greater than 5 (out of 10) but this threshold mark was not met, the final mark will be 4.5 (fail).

- According to the rules contained in "Probas de Avaliación e Actas de Cualificación de Grao e Mestrado", the so-called "second opportunity of July" is understood as a second opportunity to take the final written exam. The score of this second exam will be considered together with the others obtained during the course, corresponding to the other activities. The percentages of the different contributions will be the same as those of the former "first opportunity".

- Students who have not attended the mixed objective test and have not participated in no more than 25% of the scheduled activities will be graded as non attendance.

- Mark Honors: priority is given in the first opportunity (January). Honors may only be granted in July if their number have not be exhausted in January final qualifications.

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

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## Sources of information

Basic	
Complementary	

## Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Enxeñaría Química/610G01033

Other comments

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(\*)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.