



Teaching Guide

| Teaching Guide | | | | |
|---------------------|--|--------|--------------------|-----------|
| Identifying Data | | | | 2018/19 |
| 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 | | E-mail | | |
| Web | | | | |
| General description | The subject ?Chemical Technology? is an elective course offered in the last year of the degree in Chemistry. 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. | | | |

Study programme competences

| Code | Study programme competences |
|------|--|
| 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 |
|-------------------|-----------------------------|
|-------------------|-----------------------------|



| | | | |
|--|--|--|----------------------|
| To understand the design and operation of chemical and biological reactors. | A10 A11 A15 A24 A28 | B3 B7 | |
| To know the problems of water and air pollution and waste management, and also the technologies available to treat it. | A7 A13 A14 A16 A19 A20 A21 A22 A24 A25 A28 | B1 B2 B3 B4 B5 B6 B7 | C2 C5 C6 C8 |

| Contents | |
|---|---|
| Topic | Sub-topic |
| Chapter 1. Introduction to environmental engineering. | |
| 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 | Ordinary class hours | Student's personal work hours | Total hours |
| Guest lecture / keynote speech | A10 A11 A13 A15 A21 A25 A28 | 16 | 40 | 56 |
| Supervised projects | A10 A11 A14 A16 A21 A22 A24 A25 A28 B1 B3 B4 B5 B6 B7 C2 C5 C6 C8 | 6.5 | 26 | 32.5 |
| Laboratory practice | A7 A14 A15 A19 A20 A21 B3 B4 B5 B7 | 9 | 9 | 18 |
| Mixed objective/subjective test | A13 A14 A16 A24 B2 B3 B7 C6 | 2 | 3 | 5 |
| 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. |
| Supervised projects | The work will be prepared individually or in a small group of students on a topic related to the subject content. A written report will be given to the teacher and will be presented orally in class. |



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|---------------------------------|--|
| 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. |
| 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 |
|---------------------|--|
| Supervised projects | <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 | Description | Qualification |
|---------------------------------|--|--|---------------|
| Supervised projects | A10 A11 A14 A16 A21 A22 A24 A25 A28 B1 B3 B4 B5 B6 B7 C2 C5 C6 C8 | Students must to do a work related with the contents of the subject. In the evaluation of the works it will assess the quality of the report as well as their oral presentation. | 30 |
| Laboratory practice | A7 A14 A15 A19 A20 A21 B3 B4 B5 B7 | Attendance to all of the laboratory activities is mandatory. In the evaluation of the lab work it will take account the attitude in the lab and the quality of the results and conclusions report. | 10 |
| Mixed objective/subjective test | A13 A14 A16 A24 B2 B3 B7 C6 | Students must to do a final written exam that will assess the knowledge acquired. | 60 |

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 exam. The scores in the other activities will be the same than in the first opportunity.

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 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.

Sources of information

| | |
|----------------------|---|
| Basic | Henley EJ y Seader JD. Operaciones de separación por etapas de equilibrio en ingeniería química. Ed. Reverté, Barcelona (1988). Ramalho, R. S. Tratamiento de aguas residuales. Ed. Reverté. Barcelona (1996). Metcalf and Eddy. Ingeniería de Aguas Residuales. Tratamiento, vertido y reutilización. Labor. Barcelona (1995). Henze, M., van Loosdrecht, M. C. M., Ekama, G.A. and Brdjanovic, D.. Biological Wastewater Treatment. IWA Publishing (2008). APHA, Standard Methods for the Examination of Water and Wastewater. 20th ed., Washington DC, USA. (1998). Kennes, C. and Veiga, M.C. Bioreactors for waste gas treatment. Kluwer Academic Publishers (2001). Deublein, D. and Steinhauser, A. Biogas from waste and renewable resources: an introduction. Wiley-VCH, (2008). Anderson, W.C. Innovative site remediation technology (Vol 1-8), American Academy of Environmental Engineers, (1993). |
| Complementary | |

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

It is advised that students be able to understand English texts, since part of the information sources they will consult, are published in this language.

(*)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.