| Teaching Guide | | | | |
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| Identifying Data | | | | 2023/24 |
| Subject (*) | ENXEÑARÍA MEDIOAMBIENTAL | | Code | 730G04017 |
| Study programme | Grao en Enxeñaría en Tecnoloxías Industriais | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Graduate | 1st four-month period | Second | Obligatory | 6 |
| Language | SpanishGalician | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | Enxeñaría Naval e IndustrialQuímica | | | |
| Coordinador | Filgueira Vizoso, Almudena | E-mail | almudena.filgueira.vizoso@udc.es | |
| Lecturers | Filgueira Vizoso, Almudena<br>Rodriguez Guerreiro, Maria Jesus | E-mail | almudena.filgueira.vizoso@udc.es<br>maria.guerreiro@udc.es | |
| Web | https://campusvirtual.udc.gal/login/index.php | | | |
| General description | This subject aims to develop skills that allow students to know and identify the problem of air, water and soil pollution. Control of atmospheric pollution, liquid discharge treatments: ARU and ARI. and RSU and RSI treatment systems. The legal and environmental management aspects in the company will allow its application in the labor world. | | | |

| Study programme competences / results | |
|---|---|
| Code | Study programme competences / results |
| A16 | CR10 Coñecementos básicos e aplicación de tecnoloxías ambientais e sustentabilidade. |
| B2 | CB2 Que os estudantes saiban aplicar os seus coñecementos ao seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo |
| B3 | CB3 Que os estudantes teñan a capacidade de reunir e interpretar datos relevantes (normalmente dentro da súa área de estudo) para emitiren xuízos que inclúan unha reflexión sobre temas relevantes de índole social, científica ou ética |
| B5 | CB5 Que os estudantes desenvolvan aquelas habilidades de aprendizaxe necesarias para emprenderen estudos posteriores cun alto grao de autonomía |
| B6 | B3 Ser capaz de concibir, deseñar ou poñer en práctica e adoptar un proceso substancial de investigación con rigor científico para resolver calquera problema formulado, así como de comunicar as súas conclusións ?e os coñecementos e razóns últimas que as sustentan? a un público tanto especializados como leigo dun xeito claro e sen ambigüidades |
| B7 | B5 Ser capaz de realizar unha análise crítica, avaliación e síntese de ideas novas e complexas |
| B8 | B7 Deseñar e realizar investigacións en ámbitos novos ou pouco coñecidos, con aplicación de técnicas de investigación (con metodoloxías tanto cuantitativas como cualitativas) en distintos contextos (ámbito público ou privado, con equipos homoxéneos ou multidisciplinares etc.) para identificar problemas e necesidades |
| C1 | 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. |
| C2 | C4 Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben común. |
| C4 | C6 Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse. |
| C6 | C8 Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade. |

| Learning outcomes | |
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| Learning outcomes | Study programme competences / results |

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| Coñecer de forma básica a aplicación de tecnoloxías medioambientais | A16 | B2<br>B3<br>B5<br>B6<br>B7<br>B8 | C1<br>C2<br>C4<br>C6 |
| Coñecer de forma básica a aplicación de sostenibilidade | A16 | B2<br>B3<br>B7 | C4<br>C6 |

| Contents | |
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| **Topic** | **Sub-topic** |
| The following topics develop the contents established in the verification report card, which are: | Waste, water and atmosphere<br>Contamination<br>Management of environmental problems in the company |
| SECTION 1. WASTE | Topic 1. Solid Urban Waste<br>Topic 2. Industrial Waste |
| SECTION 2. ATMOSPHERE | Topic 3. Atmosphere. Structure and properties<br>Topic 4. Meteorology of air pollution<br>Topic 5. Composition of the atmosphere<br>Topic 6. Chemistry of the troposphere. Air pollution<br>Topic 7. Air pollutants<br>Topic 8. Control of industrial emissions into the air |
| SECTION 3. WATERS | Topic 9. Wastewater. Introduction and types<br>Topic 10. Treatments of a wastewater treatment plant |
| SECTION 4. ENVIRONMENTAL MANAGEMENT | Topic 11. Management of the company's environmental problems |

| Planning | | | | |
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| **Methodologies / tests** | **Competencies / Results** | **Teaching hours (in-person & virtual)** | **Student?s personal work hours** | **Total hours** |
| Guest lecture / keynote speech | A16 B5 B6 C1 | 33 | 33 | 66 |
| Supervised projects | B3 B7 C2 C4 | 9 | 15 | 24 |
| Laboratory practice | B8 C6 | 10 | 15 | 25 |
| Mixed objective/subjective test | B2 B3 | 0 | 10 | 10 |
| ICT practicals | A16 B3 B7 C1 C4 | 1 | 4 | 5 |
| Field trip | B2 C6 | 2.5 | 2.5 | 5 |
| Problem solving | B2 B3 B7 | 7 | 7 | 14 |
| 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 | Oral presentation complemented by the use of audiovisual media and the introduction of some questions aimed at students, in order to transmit knowledge and facilitate learning. The master class is also known as a lecture, expository method or Lecture. This last modality is usually reserved for a special type of lesson given by a teacher on special occasions, with content that implies an original elaboration based on the almost exclusive use of the word as a way of transmitting information to the audience. |

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| Supervised projects | Methodology designed to promote the autonomous learning of students, under the tutelage of teachers and in varied settings (academic and professional). It is primarily concerned with learning how to do things. It is an option based on the assumption by students of responsibility for their own learning. This teaching system is based on two basic elements: independent student learning and monitoring of that learning by the tutor. |
| Laboratory practice | Methodology that allows students to learn effectively through practical activities, such as demonstrations, exercises, experiments and research |
| Mixed objective/subjective test | Exam that integrates standard questions and objective type questions. As for the former, it includes open-ended questions of development, the latter can combine multiple-choice, ranking, short-answer, discrimination, completion and association questions. |
| ICT practicals | Practice-based learning method for theoretical subject content using ICT resources (demonstrations, simulations, etc.) ICT is an excellent medium for practical knowledge applications and information processing, and a key aid to student learning and skills development. |
| Field trip | Activities developed in a context external to the university academic environment (companies, institutions, organizations, monuments, etc.) related to the field of study of the subject. These activities focus on the development of skills related to direct and systematic observation, information gathering, product development (sketches, designs ...) |
| Problem solving | Technique through which a specific problem situation has to be solved, based on the knowledge that has been worked on, which may have more than one possible solution |

| Personalized attention | |
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| **Methodologies** | **Description** |
| ICT practicals<br>Mixed objective/subjective test<br>Field trip<br>Laboratory practice<br>Supervised projects<br>Problem solving<br>Guest lecture / keynote speech | Traballos tutelados: Recoméndase a asistencia a titorías personalizadas. Nelas o/a alumno/a recibirá orientación sobre o xeito de iniciar e levar a cabo o traballo de acordo aos criterios que se indicarán.<br><br>Presentación oral: Realizarase con apoio de diapositivas ou o material que consideren oportuno e cada alumno/a do grupo dispoñerá dun determinado tempo para esta.<br><br>Prácticas de Laboratorio: O/A alumno/a será convocado/a con anterioridade a través do Campus Virtual. As prácticas realizaránse no laboratorio de Tecnoloxía Química e Medio Ambiente (Edificio Talleres Tecnolóxicos), salvo que se indique o contrario.<br><br>En caso de dispensa académica o/a alumno/a porase en contacto coas profesoras para acordar as mellores datas para realizar cada unha das actividades previstas na materia, dentro sempre das posibilidades que permitan os horarios. |

| Assessment | | | |
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| **Methodologies** | **Competencies / Results** | **Description** | **Qualification** |
| Mixed objective/subjective test | B2 B3 | Exame | 70 |
| Laboratory practice | B8 C6 | Realización de prácticas<br>Elaboración informe | 5 |
| Supervised projects | B3 B7 C2 C4 | A amplitude do guión<br>As fontes consultadas<br>A exposición oral | 25 |
| Others | | | |

| Assessment comments |
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| The student with a grade higher than 4 in the objective tests will go on to weighing with the rest of the evaluation methodologies.<br>In the event that any of the activities mentioned above were not carried out, the qualification of that methodology will pass to the objective test.<br>In the first evaluation opportunity, both the qualification of the works and the laboratory practices will be taken into account, as long as they pass the minimum of 4 in the mixed test. This same criterion will be applicable for the second opportunity.<br>For the advanced call, the laboratory practices and the mixed test will be taken into account, therefore the latter having a value of 95% of the note and 5% the laboratory practices.<br>Attendance at laboratory practices is mandatory to pass the course. The student who presents proof of not attending the practice as must take an exam of the same as the day of the exam of the January call or, failing that, the day of the second opportunity exam.<br>The fraudulent performance of the tests or evaluation activities will directly imply the grade of failure a "0" in the matter in the corresponding call, thus invalidating any grade obtained in all the evaluation activities for the extraordinary call. |

| Sources of information | |
|---|---|
| Basic | - Hernández Muñoz, Aurelio (1998). Depuración de aguas residuales. Madrid. Servicio publicaciones EIC<br>- Metcalf-Eddy (1985). Ingeniería Sanitaria. Tratamiento, evacuación y eliminación de aguas residuales. Labor<br>- Mackenzie L. Davis/ Susan J. Masten (2004). Ingeniería y Ciencias Ambientales. México. McGraw Hill<br>- Ramalho, R.S (1991). Tratamiento de aguas residuales. Reverte<br>- Romero González, Eladio M (2015). Evaluación y gestión medioambiental para planes, programas y proyectos de ingeniería. Universidad de Sevilla<br>- Martínez Ataz, Ernesto; Díaz de Mera Morales, Yolanda (2004). Contaminación atmosférica. Ediciones de la Universidad de Castilla-La Mancha<br><br /> |
| Complementary | - Kiely, Gerard. (1999). Ingeniería ambiental : fundamentos, entornos, tecnologí.as y sistemas de gestión. McGraw-Hill<br>- Robert A. Corbitt (2003). Manual de referencia de la Ingeniería Ambiental. McGraw Hill<br>- Bautista,C - Rodríguez Vidal, Francisco (2003). Procesos de potabilización del agua e influencia del tratamiento de ozonización. Madrid. Diaz de Santos<br>- Woodside, Gayle. Patrick Aurrichio (2001). Auditoría de sistemas de gestión medioambiental : ISO 14001. Madrid. McGraw-Hill,<br>- C. Orozco;A.Pérez; Mª N. González (). Contaminación Ambiental. Una visión desde la Química. Thomson<br>- E.T.S. de Ingenieros Industriales e Ingenieros informáticos (2000). Residuos industriales y suelos contaminados.<br>- Simona Pecoraio (2015). Gestión de residuos industriales. Cano Pina S.L.<br>- Perez Gisbert, Antonio. (2011). Ingenieria del medio ambiente. MUNDIPRENSA<br>Diagrama de traatmiento Físico Químico: C. Orozco; A. Pérez; Mª N. González |

| Recommendations |
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| Subjects that it is recommended to have taken before |
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| Subjects that are recommended to be taken simultaneously |
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| Subjects that continue the syllabus |
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| Other comments |

<div><p>1. The delivery of the documentary works carried out in this matter:</p><p>  1.1. It will be requested in virtual format and / or computer support.</p><p>  1.2. It will be done through Moodle or similar, in digital format without the need to print them</p><p>  1.3. If done on paper:</p><p>     - No plastics will be used.</p><p>     - Double-sided prints will be made.</p><p>       - Recycled paper will be used.</p><p>       - Draft printing will be avoided.</p><p>2.- A sustainable use of resources and the prevention of negative impacts on the natural environment must be made.</p><p>3.- The importance of ethical principles related to the values ??of sustainability in personal and professional behavior must be taken into account.</p><p>4.- As stated in the different regulations of application for university teaching, the gender perspective must be incorporated in this matter (non-sexist language will be used, bibliography of authors of both sexes will be used, intervention in class of students will be encouraged and students ...).</p><p>5.- Work will be done to identify and modify prejudices and sexist attitudes, and the environment will be influenced to modify them and promote values of respect and equality.</p><p>6. Situations of discrimination based on gender must be detected and actions and measures will be proposed to correct them.</p><p>7. The full integration of students who for physical, sensorial, psychic or sociocultural reasons, experience difficulties to adequate, equal and beneficial access to university life will be facilitated.</p></div>