



Teaching Guide

| Identifying Data | | | | | 2023/24 |
|---------------------|---|--------|--|-----------|---------|
| Subject (*) | Recycling and the Environment | | Code | 771G01020 | |
| Study programme | Grao en Enxeñaría de Deseño Industrial e Desenvolvemento do Produto | | | | |
| Descriptors | | | | | |
| Cycle | Period | Year | Type | Credits | |
| Graduate | 1st four-month period | Fourth | Optional | 6 | |
| Language | SpanishGalician | | | | |
| Teaching method | Face-to-face | | | | |
| Prerequisites | | | | | |
| Department | Química | | | | |
| Coordinador | González Rodríguez, María Victoria | E-mail | victoria.gonzalez.rodriguez@udc.es | | |
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| Web | | | | | |
| General description | Esta asignatura desarrolla competencias para que los alumnos puedan aplicar conocimientos teóricos en el entorno medioambiental y en el diseño de nuevos productos que faciliten el reciclaje....La asignatura se imparte en castellano y gallego | | | | |

Study programme competences

| Code | Study programme competences |
|------|--|
| A5 | Identificar, formular e resolver problemas de enxeñaría. |
| A6 | Formación amplia que posibilite a comprensión do impacto das solucións de enxeñaría nos contextos económico, medioambiental, social e global. |
| A10 | Comprensión das responsabilidades éticas e sociais derivadas da súa actividade profesional. |
| B3 | Aprender a aprender. Capacidade para comprender e detectar as dinámicas e os mecanismos que estruturan a aparición e a dinámica de novas tendencias. |
| B5 | Resolver problemas de forma efectiva. |
| B6 | Traballar de forma autónoma con iniciativa. |
| B11 | Capacidade de análise e síntese. |
| C4 | Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective |
| C7 | Developing the ability to work in interdisciplinary or transdisciplinary teams in order to offer proposals that can contribute to a sustainable environmental, economic, political and social development. |
| C8 | Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society. |

Learning outcomes

| Learning outcomes | Study programme competences | | |
|--|-----------------------------|-----------------------|----------------|
| Unha formación extensiva que permite comprender a reciclaxe como a presentación dos residuos no ciclo de produción para ser reutilizados como materia prima para a fabricación de obxectos e como a solución da enxeñaría aos problemas do medio ambiente. | A5 A6 A10 | B3 B5 B6 B11 | C4 C7 C8 |
| Capacidade de tomar decisións técnicas que permiten aos alumnos para usar recursos tecnolóxicos para o desenvolvemento de coñecementos ambientais para tratar problemas do medio ambiente, coñecendo e aplicando a lexislación e normativa vixente. | A5 A6 A10 | B3 B5 B6 B11 | C4 C7 C8 |



Identificar, formular e resolver problemas ambientais asociados aos residuos .

| | | |
|-----|-----|----|
| A5 | B3 | C4 |
| A6 | B5 | C7 |
| A10 | B6 | C8 |
| | B11 | |

| Contents | |
|--|---|
| Topic | Sub-topic |
| TEMA 1.- INTRODUCCIÓN | <p>1.1. Desenvolvemento Sostible e Medio Ambiente. Problemas ambientais.</p> <p>A Atmosfera:</p> <ul style="list-style-type: none"> -o quecemento global, efecto invernadoiro. -a destrución do ozono, smog fotoquímico. -a choiva ácida . -a radioactividade, radiacións ionizantes e non ionizantes. -o transporte, o ruído. <p>O auga: Purificación do auga. Descrición da ETAP e unha EDAR.</p> <p>Chans: Residuos sólidos urbanos.</p> <p>1.2. Produción dos residuos.</p> <p>1.3. Xestión dos residuos.</p> <p>1.4. Sistemas do tratamento de residuos.</p> <p>1.5. Impacto Ambiental.</p> |
| TEMA 2.- ASPECTOS LEXISLATIVOS | <p>2.1. Regulamentos rexionais nacionais e da UE: envases e embalaxes, medio ambiente</p> |
| TEMA 3.- RECICLAXE | <p>3.1. Definición e posibilidades do sistema.</p> <p>3.2. Ecoproductos. Factores que determinan o seu desenvolvemento.</p> <p>3.3. Industria para as demandas de produtos ecolóxicos.</p> <p>3.4. Eco-productos e desenvolvemento sostible.</p> <p>3. . Avaliación do ciclo de vida dos produtos. balance enerxético ambiental. Inventario de ciclo de vid . Estudo de impacto ambiental. Propostas para mellorar o proceso.</p> |
| TEMA 4.- CARACTERIZACIÓN DOS FLUXOS DOS RESIDUOS | <p>4.1. Visión xeral.</p> <p>4.2. Métodos.</p> <p>4.3. A caracterización analítica.</p> <p>4.3.1. O poder calorífico.</p> <p>4.3.2. Análise inmediata: O contido de humidade, materiais volátiles, carbono fixo, cinzas ...</p> <p>4.3.3. Análise elemental. Determinación de residuos de cinzas: carbono, hidróxeno, xofre, osíxen , nitróxeno, cloro ...</p> <p>4.3.4. Análise básica: Determinación da acidez, herbicidas, hidrocarburos, compostos orgánicos volátiles, amianto, dioxinas</p> <p>4.4. O Reciclaxe e caracterización dos residuos .</p> |
| TEMA 5.- PROGRAMAS E INSTALACIONES DE RECICLAXE | <p>5.. Supervisión do rendemento dos sistemas de seguimento de separación e recollida .</p> <p>5.2. Instalacións de procesamento de materiais reciclables .</p> <p>5.3. Problemas e solucións para o desenvolvemento do mercado .</p> <p>5.4. A psicoloxía do reciclaxe .</p> |



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| TEMA 6. APLICACIONES DO RECICLAXE | <p>6.1. Papel</p> <p>6.2. Botellas de vidro para bebidas. Plásticos.</p> <p>6.3. Chatarra e latas de ferro. Latas de aluminio.</p> <p>6.4. Reciclaxe de metais. Baterías e pilas.</p> <p>6.5. Produtos de líña branca. Vehículos fora de uso. Neumáticos.</p> <p>6.6. Aceite usado. Biocombustibles</p> <p>6.7. Residuos domésticos perigosos.</p> |
| TEMA 7.- INTEGRACIÓN DO RECICLAXE EN VERTEDOIROS E INCINERADORES. | <p>7.1. Ventaxas da súa implantación.</p> <p>7.2. Relaciones.</p> <p>7.3. Operacions de recuperación de materiais.</p> <p>7.4. Economía.</p> |
| TEMA 8.- CONTROL DA CALIDADE | <p>8.1. Necesidad do control de calidade.</p> <p>8.2. Comprobación do control de calidade.</p> <p>8.3. Xestión Ambiental. Normas ISO 14000: Estudio e implementación. Ventaxas do sistema de xestión ambiental.</p> |

| Planning | | | | |
|--------------------------------|------------------------------------|----------------------|-------------------------------|-------------|
| Methodologies / tests | Competencies | Ordinary class hours | Student?s personal work hours | Total hours |
| Oral presentation | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | 0.5 | 5 | 5.5 |
| Guest lecture / keynote speech | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | 24 | 60 | 84 |
| Objective test | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | 0.5 | 4 | 4.5 |
| Seminar | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | 10 | 15 | 25 |
| Supervised projects | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | 10 | 20 | 30 |
| 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 |
| Oral presentation | Core component of teaching-learning process involving coordinated oral interaction between student and teacher, including proposition, explanation and dynamic exposition of facts, topics, tasks, ideas and principles. |
| Guest lecture / keynote speech | Oral presentation (using audiovisual material and student interaction) designed to transmit knowledge and encourage learning. Presentations of this type are variously referred to as ?expository method?, ?guest lectures? or ?keynote speeches?. (The term ?keynote? refers only to a type of speech delivered on special occasions, for which the lecture sets the tone or establishes the underlying theme; it is characterised by its distinctive content, structure and purpose, and relies almost exclusively on the spoken word to communicate its ideas.) |
| Objective test | Written learning progress test, characterised by pre-determined answers. Well-designed tests offer objectively quantifiable results in relation to student knowledge, capacities, skills, performance, aptitudes, attitude, intelligence, etc. Used for diagnostic, formative and summative assessment. May consist of all or any of the following types of questions: multiple choice, ordering and sequencing, short answer, binary, completion, multiple matching. |
| Seminar | Group work technique aimed at in-depth exploration of given topic, consisting of group discussion, individual engagement, preparation of texts and collective conclusions. |
| Supervised projects | Supervised learning process aimed at helping students to work independently in a range of contexts (academic and professional). Focused primarily on learning ?how to do things? and on encouraging students to become responsible for their own learning. |



Personalized attention

| Methodologies | Description |
|---------------------|---|
| Supervised projects | Comment on the development of contents and make the oral presentation. Resolve specific questions about the follow-up of the topic and make observations on the work done. |

Assessment

| Methodologies | Competencies | Description | Qualification |
|---------------------|------------------------------------|---|---------------|
| Oral presentation | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | Oral presentation of the student's work on recycling. | 10 |
| Objective test | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | Written test | 40 |
| Supervised projects | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | Students do individual work on a recycling topic. This must be presented in digital format without the need to print it and orally to the rest of the students. | 30 |
| Seminar | A5 A10 A6 B3 B5 B6 B11 C4 C7 C8 | Preparation and delivery of documents prepared in the classroom. | 20 |
| Others | | | |

Assessment comments

The student with recognition of part-time dedication and academic exemption from attendance will be evaluated through the grade obtained in the final exam (80%) and the completion of supervised work (20%).

For the evaluation of the second opportunity, the same continuous evaluation activities can be carried out as during the course.

Fraudulent performance of tests or evaluation activities will directly imply a fail grade of '0' in the subject in the corresponding call, thus invalidating any grade obtained in all evaluation activities for the extraordinary call.

Sources of information

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| Basic | <ul style="list-style-type: none">- () . .- Fullana, P. y Puig, R. (1997). Análisis del Ciclo de Vida . Ed. Rubes. Barcelona.- Asociación Española para la Promoción del Desarrollo del Análisis del Ciclo de Vida (APRODACV) (1998). Análisis del Ciclo de Vida 2000 . Barcelona- Rieradevall, J. (1996). Diseño de Productos Respetuosos con el Medio Ambiente: proyecto, producción, producto, consumo y valoración . UNED- Tchobanoglous, G.; Theisen, H.; Vigil, S.A. (1994). Gestión Integral de Residuos Sólidos . Ed. McGraw-Hill / Interamericana de España, S.A. Madrid- Cléments, R.B. (2000). Guía completa de las normas ISO 14000 . Ediciones Gestión 2000.- Lund, F.H. (1996). Manual McGraw-Hill de Reciclaje . Ed. McGraw-Hill / Interamericana de España, S.A. Madrid- AENOR (1999). Principios del Desarrollo Sostenible. Madrid, ?. AENOR, N.A.- Doménech, X. (1994). Química Ambiental. El Impacto Ambiental de los Residuos . Ed. Miraguano, Madrid- Xavier Elías Castells (2009). Reciclaje de Residuos Industriales (Residuos sólidos urbanos y fangos de depuradora). España, Díaz de Santos |
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|----------------------|---|
| Complementary | <ul style="list-style-type: none"> - Fullana, P. y Puig, R. (1997). Análisis del Ciclo de Vida. Ed. Rubes. Barcelona. - Asociación Española para la Promoción del Desarrollo del Análisis del Ciclo de Vida (APRODACV) (1998). Análisis del Ciclo de Vida 2000. Barcelona - Rieradevall, J. (1996). Diseño de Productos Respetuosos con el Medio Ambiente: proyecto, producción, producto, consumo y valoración. UNED - Tchobanoglous, G.; Theisen, H.; Vigil, S.A. (1994). Gestión Integral de Residuos Sólidos. Ed. McGraw-Hill / Interamericana de España, S.A. Madrid - Cléments, R.B. (2000). Guía completa de las normas ISO 14000. Ediciones Gestión 2000. - Lund, F.H. (1996). Manual McGraw-Hill de Reciclaje. Ed. McGraw-Hill / Interamericana de España, S.A. Madrid - AENOR (1999). Principios del Desarrollo Sostenible. Madrid, ? AENOR, N.A. - Doménech, X. (1994). Química Ambiental. El Impacto Ambiental de los Residuos. Ed. Miraguano, Madrid |
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Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Deseño e Produto/771011301
 Xestión de Calidade/771011504
 Loxística Industrial/771011507

Subjects that continue the syllabus

Materiais/771011202

Other comments

Recommendations Sustainability Environment, People and Gender Equality: To help achieve a sustainable environment and meet the objective of action number 5: "Healthy and environmentally and socially sustainable teaching and research" of the "Ferrol Green Campus Action Plan": 1.- The delivery of the documentary works that are carried out in this matter: 1.1. It will be requested in virtual format and/or computer support. 1.2. It will be done through Moodle, in digital format without the need to print them. 1.3. If done on paper:

- No plastics will be used.

- Double-sided prints will be made.

- Recycled paper will be used.

- The printing of drafts will be avoided.2.- The sustainable use of resources and the prevention of negative impacts on the natural environment must be made. 3.- The importance of ethical principles related to the values ??of sustainability in personal and professional behavior must be taken into account.4.- In accordance with the different applicable regulations for university teaching, the gender perspective will be incorporated in this matter (a non-sexist language will be used, the bibliography of authors of both sexes will be used, intervention in class of students and students...) 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. 6.- Situations of gender discrimination must be detected and actions and measures are proposed to correct them 7.- The total integration of students who, for physical, sensory, mental or sociocultural reasons, experience difficulties for adequate, equal and beneficial access to university life will be facilitated.

(*)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.