

## GUÍA DOCENTE ABREVIADA DE LA ASIGNATURA

G605 - Renewable and Alternative Energies

Grado en Ingeniería de los Recursos Energéticos

Curso Académico 2021-2022

| 1. DATOS IDENTIFICATIVOS |  |                      |                   |                      |
|--------------------------|--|----------------------|-------------------|----------------------|
| Título/s                 | Grado en Ingeniería de los Recursos Energéticos  |                      | Tipología v Curso | Obligatoria. Curso 4 |
| Centro                   | Escuela Politécnica de Ingeniería de Minas y Energía   |                      |                   |                      |
| Módulo / materia         | MATERIA TECNOLOGÍA ELÉCTRICA AVANZADA<br>MÓDULO FORMACIÓN EN RECURSOS ENERGÉTICOS, COMBUSTIBLES Y EXPLOSIVOS |                      |                   |                      |
| Código y denominación    | G605 - Renewable and Alternative Energies  |                      |                   |                      |
| Créditos ECTS            | 6  | Cuatrimestre         | Cuatrimestral (1) |                      |
| Web                      | <a href="https://ocw.unican.es/course/view.php?id=69">https://ocw.unican.es/course/view.php?id=69</a>        |                      |                   |                      |
| Idioma de impartición    | Inglés   | Forma de impartición | Presencial        |                      |

|                      |   |  |  |
|----------------------|---|--|--|
| Departamento         | DPTO. INGENIERIA ELECTRICA Y ENERGETICA   |  |  |
| Profesor responsable | PABLO BERNARDO CASTRO ALONSO  |  |  |
| E-mail               | pablo.castro@unican.es  |  |  |
| Número despacho      | E.P. de Ingeniería de Minas y Energía. Planta: + 0. DESPACHO SUBDIRECCION 059 (059) |  |  |
| Otros profesores     |   |  |  |

### 3.1 RESULTADOS DE APRENDIZAJE

- Ability to cope with the present situation of the energy system and its possible evolution.
- Deeper knowledge of the concept of energy and its applications on renewable sources.
- To obtain the necessary skills to carry out engineering projects that use renewable energy sources.

#### 4. OBJETIVOS

To obtain a quantitative view of the use of different energy sources at national and international level.

To learn about the different sources of renewable and alternative energy used today and others that can be used in the near future.

To be familiar with national and international regulations governing the use of renewable energy.

To design facilities to obtain work and energy using renewable sources.

#### 6. ORGANIZACIÓN DOCENTE

##### CONTENIDOS

|   |   |
|---|---|
| 1 | Introduction to renewable energies.   |
| 2 | Wind Energy:<br>1.1. Wind as a power generator.<br>1.2. Wind turbines: technical aspects.<br>1.3. Wind farms.<br>1.4. Legal aspects of wind energy.   |
| 3 | Solar Energy:<br>2.1. Solar radiation.<br>2.2. Solar thermal collectors.<br>2.3. Solar thermal utilization.<br>2.4. Solar thermal power plants.<br>2.5 Solar panels.<br>2.6. Photovoltaic applications. |
| 4 | Ocean Energy:<br>3.1. Tidal power.<br>3.2. Wave power.<br>3.3. Ocean thermal energy.  |
| 5 | Hydropower:<br>4.1. Hydropower facilities.<br>4.2. Hydropower resources management.<br>4.3. Types of turbines.<br>4.4. Study of suitable sites by topographic, hidrologic and economical aspects.       |
| 6 | Geothermal Energy:<br>5.1. Geothermal resources.<br>5.2. Geothermal exploration methods.<br>5.3. Geothermal energy application.<br>5.4. District heating design.  |
| 7 | Biomass and Biofuels:<br>6.1. General aspects.<br>6.2. Types of biomass.<br>6.3. Biofuels: Types and production.<br>6.4. Urban Solid Waste.   |
| 8 | Energy of hydrogen:<br>7.1. General aspects.<br>7.2. Hydrogen production.<br>7.3. Storage and distribution.<br>7.4. Applications.   |

## 7. MÉTODOS DE LA EVALUACIÓN

| Descripción  | Tipología      | Eval. Final | Recuper. | %             |
|--|----------------|-------------|----------|---------------|
| Laboratory report  | Trabajo        | No          | No       | 20,00         |
| Classwork  | Trabajo        | No          | No       | 20,00         |
| Mid-term exam  | Examen escrito | Sí          | Sí       | 30,00         |
| Mid-term exam  | Examen escrito | Sí          | Sí       | 30,00         |
| <b>TOTAL</b>   |                |             |          | <b>100,00</b> |
| <b>Observaciones</b>   |                |             |          |               |
| To pass the subject through continuous assessment is necessary to achieve simultaneously :   |                |             |          |               |
| <ul style="list-style-type: none"> <li>-To submit the laboratory report.</li> <li>-To attend to 75% of the class activities.</li> <li>-To obtain more than 30% of the maximum score in the mid-term exams.</li> <li>-To obtain a final average score of 50% or more of the maximum score.</li> </ul> |                |             |          |               |
| In the case of not reaching the minimum score in the mid-term exams, the final mark will be the minimum between 4.9 and the average score of all the evaluation activities. The partial marks will be kept until the September call.   |                |             |          |               |
| <b>Criterios de evaluación para estudiantes a tiempo parcial</b>   |                |             |          |               |
| Part-time students must take an exam of all the contents and 100% of the total score of the subject in the February or September call.   |                |             |          |               |

## 8. BIBLIOGRAFÍA Y MATERIALES DIDÁCTICOS

| BÁSICA   |
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| Twidell, John; Weir, Tony. Renewable Energy Resources. (2006). Taylor & Francis.   |
| Tushar K. Ghosh; Mark A. Prells. Energy Resources and Systems. Volume 2: Renewable Resources. (2011). Springer.                            |
| Paul Breeze; Aldo Vieira et al. Renewable Energy Focus Handbook. (2009). Elsevier.   |
| Martin Kaltschmitt; Wolfgang Streicher; Andreas Wiese. Editors. Renewable Energy, Technology, Economics and Environment. (2007). Springer. |
| M. Kanoglu; Y. Cengel; J. Cimbala. Fundamentals and applications of renewable energy. Mc Graw Hill (2020)                                  |

Esta es la Guía Docente abreviada de la asignatura. Tienes también publicada en la Web la información más detallada de la asignatura en la Guía Docente Completa.