

## GUÍA DOCENTE ABREVIADA DE LA ASIGNATURA

G605 - Renewable and Alternative Energies

Grado en Ingeniería de los Recursos Energéticos

Curso Académico 2019-2020

| 1. DATOS IDENTIFICATIVOS |  |                      |                   |                      |
|--------------------------|--|----------------------|-------------------|----------------------|
| Título/s                 | Grado en Ingeniería de los Recursos Energéticos  |                      | Tipología y 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                      |  |                      |                   |                      |
| Idioma de impartición    | Inglés   | Forma de impartición | Presencial        |                      |

|                      |   |  |  |
|----------------------|---|--|--|
| Departamento         | DPTO. INGENIERIA ELECTRICA Y ENERGETICA   |  |  |
| Profesor responsable | PABLO BERNARDO CASTRO ALONSO  |  |  |
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| 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  |
| TOTAL  |                |             |          | 100,00 |
| Observaciones  |                |             |          |        |
| <p>To pass the subject through continuous assessment is necessary to achieve simultaneously :</p> <ul style="list-style-type: none"> <li>-To submit the laboratory report.</li> <li>-To attend to 80% 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> <p>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.</p> |                |             |          |        |
| Observaciones para alumnos a tiempo parcial  |                |             |          |        |
| Part-time students must take an exam of all the contents of the subject in the February or September call.   |                |             |          |        |

## 8. BIBLIOGRAFÍA Y MATERIALES DIDÁCTICOS

| BÁSICA   |
|--|
| 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. |

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.