SUBJECT TEACHING GUIDE

G605 - Renewable and Alternative Energies

Degree in Energy Resources Engineering

Academic year 2018-2019

1. IDENTIFYING DATA					
Degree	Degree in Energy Resources Engineering			Type and Year	Compulsory. Year 4
Faculty					
Discipline	Subject Area: Advanced Electrical Technology Module: Training in Energy Resources, Fuels and Explosives				
Course unit title and code	G605 - Renewable and Alternative Energies				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	English			Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA ELECTRICA Y ENERGETICA
Name of lecturer	PABLO BERNARDO CASTRO ALONSO
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Other lecturers	

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

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Laboratory report	Work	No	No	20,00
Classwork	Work	No	No	20,00
Mid-term exam	Written exam	Yes	Yes	30,00
Mid-term exam	Written exam	Yes	Yes	30,00
TOTAL				100,00

Observations

To pass the subject through continuous assessment is necessary to achieve simultaneously :

-To submit the laboratory report.
-To attend to 80% of the class activities.
-To obtain more than 30% of the maximum score in the mid-term exams.
-To obtain a final average score of 50% or more of the maximum score.

Observations for part-time students

Part-time students must take an exam of all the contents of the subject in the February or September call.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Twidell, John; Weir, Tony. Renewable Energy Resources. (2006). Taylor & Francis.

Tushar K. Ghosh; Mark A. Prelas. Energy Resources and Systems. Volume 2: Renewable Resources. (2011). Springer.

Paul Breeze; Aldo Vieira et all. Renewable Energy Focus Handbook. (2009). Elsevier.

Martin Kaltschmitt; Wolfgang Streicher; Andreas Wiese. Editors. Renewable Energy, Technology, Economics and Environment. (2007). Springer.