

28961 - Energy uses of products and wastes

Información del Plan Docente

Academic Year	2016/17
Academic center	201 - Escuela Politécnica Superior
Degree	437 - Degree in Rural and Agri-Food Engineering
ECTS	5.0
Course	4
Period	Second semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning methodology designed for this subject is based on:

1. Participative lecture will be the method used during the development of the theoretical classes. With this method, it is intended to encourage the active participation of students by formulating questions and/or exercises that help break the monotonous rhythm of the sessions.

2. In the practical sessions problems related to the theoretical contents will be solve. During their development, student

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participation and cooperative work will be encouraged.

3. In the practical sessions with Hysys flowcharts of various industries related to energy use be studied and resolved.

4. In the technical visits the students will acquire a practical and realistic view of the theoretical and practical contents studied in the course. Two visits are planned, corresponding to two different types of energy technologies.

5.2.Learning activities

The program includes the following activities:

1. Theoretical classes. Classroom activity in which the contents of the proposed topics will be developed. The total duration of this activity throughout the course will be 26 hours.

2. Practical sessions. Classroom activity in which problems related to the contents of the subject will be solved. They will be carried out in the computer room in groups of 20 students, with a total of 18 hours (9 sessions of 2 hours).

3. Technical visits. This activity includes two visits to industries related to optimization of energy (8 hours).

4. Study. Personal study.

5. Tutorials.

5.3.Program

Theory programme

1. The problems related to energy

2. Generation of energy from fossil resources

3. Types of biomass, waste and crops.

4. Energy uses of biomass, biogas, bioethanol, biodiesel, biomass.

5. Technologies related to biomass and waste. Characterization, energy conversion technologies, resource optimization technologies

Practical programme

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* Biomass combustion

* Characterization of waste

* Waste Incineration

* Estimation of gas production in a landfill.

* Computer simulation of process using Hysys: MTBE production

5.4.Planning and scheduling

WEEK	THEORETICAL CLASSES	PRACTICAL SESSIONS	VISITS
1	B1		
2	B1		
3	B2		
4	B2	S1	
5	B2	S2	VIS1
6	B3	S3	
7	B3	S4	
8	B4	S5	
9	B4	S6	
10	B4	S7	VIS2
11	B5	S8	
12	B5	S9	

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13	B5		
14			
15			

5.5. Bibliography and recommended resources

Basic bibliography

- CAMPS, M. Y MARCOS, F. Los biocombustibles. Madrid: Mundi Prensa, 2002
- MADRID, A. La biomasa y sus aplicaciones energéticas. Madrid: AMV Ediciones, 2012
- G. Tchobanoglous y otros. Gestión integral de residuos sólidos. Mc Graw Hill 1996.

Complementary bibliography

- ELIAS, X. Tratamiento y valoración energética de residuos. Díaz de Santos, 2005.
- LINARES, J.I et al.. Biomasa, estado actual y perspectiva inmediata. Madrid: Asociación Nacional de Ingenieros del ICAi: Universidad Pontificia Comillas, 2009