Universidad Zaragoza

Year : 2019/20

28961 - Energy uses of products and wastes

Syllabus Information

Academic Year: 2019/20
Subject: 28961 - Energy uses of products and wastes
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 437 - Degree in Rural and Agri-Food Engineering
583 - Degree in Rural and Agri-Food Engineering
ECTS: 5.0
Year: 4
Semester: Second semester
Subject Type: Optional
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. a wide range of teaching tasks is implemented such as:

- 1. The 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 solved. During their development, student 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.

4.2.Learning tasks

The program includes the following activities:

- 1. Theoretical classes. Classroom activity in which the contents of the proposed topics will be developed.

- 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.
- 3. Technical visits. This activity includes two visits to industries related to optimization of energy.
- 4. Study. Personal study.
- 5. Tutorials.

4.3.Syllabus

The course includes the following learning tasks:

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

- Biomass combustion
- Characterization of waste
- Waste Incineration
- Estimation of gas production in a landfill.
- Computer simulation of process using Hysys: MTBE production

4.4.Course planning and calendar

Activity / Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Classroom activity																					*51*
Theory	2	2	2	2	2	2	2	2			2	2	2	2							24
Practical sessions				2	2	2	2	2				2	2								14
Visits								5						5							10
Evaluation																			3		3
Personal work																					*74*
Individual work	3	3	3	3	3	3	3	1	5	3	3	3	4	3	5	8	8	8	2		74
TOTAL	5	5	5	7	7	7	7	10	5	3	5	7	8	10	5	8	8	8	5		*125*

4.5.Bibliography and recommended resources

BB Biomasa, estado actual y perspectiva inmediata / editores, José Ignacio Linares Hurtado ... [et al.] ; autores, Jesús Fernández González ... [et al.] . Madrid : Asociación Nacional de Ingenieros del ICAI : Universidad Pontificia Comillas, D.L. 2009

BB Camps Michelena, Manuel. Los biocombustibles / Manuel Camps Michelena, Francisco Marcos Martín . 2ª ed. rev. y amp. Madrid : Mundi-Prensa, 2008

BB Madrid Vicente, Antonio. La biomasa y sus aplicaciones energéticas / Antonio Madrid Vicente . 1ª ed. Madrid : AMV Ediciones, 2012

BB Tchobanoglous, George. Gestión integral de residuos solidos / George Tchobanoglous, Hilary Theisen,

Samuel Vigil ; traducción y revisión técnica Juan Ignacio Tejero Monzón, José Luis Gil Diaz, Marcel Szanto Narea . - [1a. ed. en español, reimpr.] Madrid [etc.] : McGraw-Hill, D.L.1996

BC Tratamiento y valorización energética de residuos / Xavier Elias Castells, director . [Madrid] : Fundación Universitaria Iberoamericana : Díaz de Santos, D.L. 2005

The recommended bibliography can be consulted in:
http://psfunizar7.unizar.es/br13/egAsignaturas.php?codigo=28961&Identificador=14252