

## 66230 - Waste Valorization

### Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	531 - Master's in Chemical Engineering
ECTS	6.0
Course	2
Period	First 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 process that is designed for this subject is based on the following:

The learning process will take place at several levels: lectures, problem solving (cases), and regular deliveries of personal work, in order to increase the student participation. In the lectures the fundamentals of each topic will be presented.

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Model cases will be presented and analyzed for a better comprehension.

The problems and industrial cases are the effective complement and way to allow and verify the comprehension of each concept. They also try to develop the critical viewpoint of the processes trying to look at the industry.

### 5.2.Learning activities

**The program offered to the students is planned to achieve the expected results and includes the following activities.**

Lectures (35 h) where the theory of the different issues that have been proposed will be taught. Practical cases will be analyzed by example's methodology.

Practical cases (15 h). In these classes, practical cases will be solved by students supervised by the professor. Problems or cases will be related to the theoretical part explained in lectures.

Application work (24 h personal work), individual or group. Various activities by will be proposed by the teachers.

Individual study (56 h personal work). It is strongly recommended, to the students, to perform the study continuously throughout the semester

Personalized Tuition (10 hours).

Evaluation (10 h). A global test where knowledge will be assessed

### 5.3.Program

A summary of the program is as follow:

#### SECTION 1. INTRODUCTION

Wastes valorization processes: preparation for reuse, recycling, other varlorization processes (energy recovery). Analysis of advantages and limitations.

#### SECTION 2. RECYCLING, and REUSE INDUSTRIAL PROCESSES

1. Description of processes and technologies. Application to different sectors (glass, plastics, used tires, vehicles out of use, biodegradable organic waste, etc.). National and regional strategic agendas for wastes and residues.

2. Recovery of waste materials landfilled "landfill mining"

#### SECTION 3. INDUSTRIAL PROCESSES ENERGY RECOVERY

Description of processes and technology. Incineration with energy recovery, pyrolysis, gasification. Biodiesel production.

#### SECTION 4. SYNERGY BETWEEN DIFFERENT PROCESSES

Biorefinery concept. integral valorization of residual biomass.

### 5.4.Planning and scheduling

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### Schedule sessions and presentation of personal work

Lectures and solving problems classes are held according to schedule established by the EINA Faculty. Professors also will inform its hours of tutoring.

### 5.5. Bibliography and recommended resources

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|-----------|---|
| <b>BB</b> | Handbook of solid waste management / [editors] George Tchobanoglous, Frank Kreith . - 2nd ed. New York [etc.] : McGraw Hill, cop. 2002                            |
| <b>BB</b> | Tratamiento y valorización energética de residuos / Xavier Elias Castells, director [Madrid] : Fundación Universitaria Iberoamericana : Díaz de Santos, D.L. 2005 |