

## 66228 - Paper Technology

### Información del Plan Docente

<b>Academic Year</b>	2016/17
<b>Academic center</b>	110 - Escuela de Ingeniería y Arquitectura
<b>Degree</b>	531 - Master's in Chemical Engineering
<b>ECTS</b>	3.0
<b>Course</b>	1
<b>Period</b>	Second semester
<b>Subject Type</b>	Optional
<b>Module</b>	---

### **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 course is structured in:

- 20 hours of theoretical lectures, in which the main concepts will be explained.
- 10 hours of group work, under the supervision of the professor.
- 20 hours for visits to pulp and paper plants, and work on a real case.
- 22 hours of autonomous work.
- 3 hours of examination.

The Anillo Digital Docente (ADD) of the University of Zaragoza will be used as a teaching tool.

#### **5.2.Learning activities**

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### 5.3.Program

- 1. The paper industry. Types and characteristics. Chemical, semi-chemical, mechanical, thermomechanical and recovered paper processes.
- 2. Raw materials: wood, crops, residues, recovered papers. Fiber properties.
- 3. Types of paper. Structure and properties of paper. Industrial papers, for writing, tissue. Properties: structural, mechanical, surface, barrier.
- 4. The process of pulp production. Unit operations. Digestion, Bleaching, Disintegration, Refining, Pulping. Design of production processes.
- 5. Paper production and quality control. Wet end and dry end operations. Testing of pulp and paper.
- 6. Chemicals in the paper industry. Chemicals added in the pulp and paper production.
- 7. Environmental aspects of the pulp and paper industry. Emission levels. Resource management. Best available techniques. Energy management.

### 5.4.Planning and scheduling

The time planning for the subject is as follows:

Topic 1: The paper industry. 2 h (l)

Item 2: Raw Materials. 2 h (l)

Item 3: Types of Paper. 2 h (l)

Item 4: The pulp production process. 4 h (l), 3 h (gw)

Item 5: paper production process and quality control. 3 h (l), 3 h (gw)

Item 6: Chemicals in the paper industry. 3 h (l), 2 h (gw)

Item 7: Environmental aspects of the industry of pulp and paper. 4 h (l), 2 h (gw)

l: lecture, gw: Group work in the classroom

### 5.5.Bibliography and recommended resources

BB

Bajpai, P. Environmentally Friendly

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**BB**

Production of Pulp and Paper / P. Bajpai.  
Ed. Wiley. 2010  
Smook, Gary A.. Handbook for pulp &  
paper technologists / Gary A. Smook . -  
3rd ed. Vancouver : Angus Wilde, cop.  
2002

### LISTADO DE URLs:

ASPAPEL (Asociación Española de  
Fabricantes de Pasta, Papel y Cartón) - [  
<http://www.aspapel.es>]  
Documento de referencia de Mejores  
Técnicas Disponibles en la industria de la  
pasta y el papel Ministerio del Medio  
Ambiente - [  
[http://www.prtr-es.es/data/images/BREF%20Pasta%20y%20Papel%20\(versi%C3](http://www.prtr-es.es/data/images/BREF%20Pasta%20y%20Papel%20(versi%C3)