

## 66228 - Paper Technology

### Syllabus Information

**Academic Year:** 2020/21

**Subject:** 66228 - Paper Technology

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 531 - Master's in Chemical Engineering

**ECTS:** 3.0

**Year:** 1

**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 achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, group work, visits, assignments, autonomous work, and assessment.

Students will have access to the classroom materials using the tools available at the university of Zaragoza. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

#### 4.2.Learning tasks

The course includes the following learning tasks:

- Lectures (18 hours). The main concepts will be explained.
- Group work (10 hours). Group work in class under the supervision of the professor.
- Visits (2 hours). Visits to pulp and paper plants, so students can work on a real case.
- Autonomous work (25 hours).
- Guided assignment (16 hours).
- Assessment (4 hours).

### 4.3.Syllabus

The course will address the following topics:

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.

### 4.4.Course planning and calendar

The course will address the following topics:

- Topic 1: The paper industry. 2 h (l)
- Topic 2: Raw Materials. 2 h (l)
- Topic 3: Types of Paper. 2 h (l)
- Topic 4: The pulp production process. 4 h (l), 3 h (gw)
- Topic 5: paper production process and quality control. 3 h (l), 3 h (gw)
- Topic 6: Chemicals in the paper industry. 3 h (l), 2 h (gw)
- Topic 7: Environmental aspects of the industry of pulp and paper. 4 h (l), 2 h (gw)

\* Legend: l =lecture, gw =Group work

### 4.5.Bibliography and recommended resources

[http://biblos.unizar.es/br/br\\_citas.php?codigo=66228&year=2019](http://biblos.unizar.es/br/br_citas.php?codigo=66228&year=2019)