

## 29718 - Materials Technology

### Syllabus Information

**Academic Year:** 2019/20

**Subject:** 29718 - Materials Technology

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

**Degree:** 434 - Bachelor's Degree in Mechanical Engineering  
330 - Complementos de formación Máster/Doctorado

**ECTS:** 6.0

**Year:** XX

**Semester:** 330 - Second semester

434 - Second semester

**Subject Type:** 434 - Compulsory

330 - ENG/Complementos de Formación

**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. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, laboratory sessions, autonomous work, and tutorials.

Students are expected to participate actively in the class throughout the semester.

Further information regarding the course will be provided on the first day of class.

### 4.2.Learning tasks

The course includes the following learning tasks:

- Lectures (1,52 ECTS): 38 hours.
- Laboratory sessions (0,48 ECTS): 12 hours.
- Guided assignments (0,40 ECTS): 10 hours.
- Autonomous work (2 ECTS): 50 hours.

- Tutorials (1,6 ECTS): 40 hours.

Lectures: the professor will explain the theoretical contents of the course and solve illustrative applied problems. These problems and exercises can be found in the problem set provided at the beginning of the semester. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Laboratory sessions: sessions will take place every 2 weeks (4 sessions in total) and the last 3 hours each. Students will work together in groups actively doing tasks such as practical demonstrations, measurements, calculations, and the use of graphical and analytical methods.

Guided assignments: students will complete assignments, problems and exercises related to concepts seen in laboratory sessions and lectures. They will be submitted at the beginning of every laboratory session to be discussed and analyzed. If assignments are submitted later, students will not be able to take the assessment test.

Autonomous work: students are expected to spend about 90 hours to study theory, solve problems, prepare lab sessions, and take exams.

### **4.3.Syllabus**

The course will address the following topics:

1. Forming of metals. Solidification and casting. Metal forming. Powder metallurgy.
2. Forming of polymers. Thermosets, thermoplastics, rubbers.
3. Forming of composite materials.
4. Forming of ceramics and glasses. Traditional ceramics. Advanced ceramics. Glass.
5. Joining technologies. The metallurgy of welding.
6. Oxidation and corrosion of metals. Degradation of polymers.
7. Brittle fracture of ceramics. Creep. Creep-fatigue interaction.
8. Failure analysis. Non destructive testing. Methodology.
9. Materials selection for mechanical design.

### **4.4.Course planning and calendar**

For further details concerning the timetable, classroom and further information regarding this course, please refer to the "Escuela de Ingeniería y Arquitectura " website (<https://eina.unizar.es/>)

### **4.5.Bibliography and recommended resources**