

29918 - Materials Engineering

Información del Plan Docente

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| Academic Year | 2018/19 |
| Subject | 29918 - Materials Engineering |
| Faculty / School | 110 - Escuela de Ingeniería y Arquitectura |
| Degree | 435 - Bachelor's Degree in Chemical Engineering |
| ECTS | 6.0 |
| Year | 2 |
| Semester | Second semester |
| Subject Type | Compulsory |
| 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

1. The lectures are based on the explanation of the subject fundamentals. The teacher uses presentations in ppt, accompanied on occasions of videos.
2. Case studies. The Professor poses them in the classroom for discussion on it, at the time corresponding to the content developed in class.
3. Six 2-hour lab sessions are distributed throughout the course. Before each session, the student must have read the script. During and after each practice session the student must make a report.

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4. Work material selection: each student will perform a work, where he must justify the choice of certain materials for a particular application or specific products. This work will be presented in person to the teacher throughout the last week of class or in the days allocated to continuous evaluation
5. Group work using problem based learning methodology. Multidisciplinary work in groups of five/six students with the subjects of Mechanical Engineering and Fluid Mechanics

4.2.Learning tasks

- Lectures: 45 hours
- Laboratory sessions: 12 hours
- Guided assignment (project-base learning group work and material selection individual work): 3 hours
- Oral presentation of works to the teacher/s: 1 hour
- Evaluation: 3 hours
- Autonomous work: 86 hours

4.3.Syllabus

Block A: Study and understanding of the basic concepts associated with the microstructure of materials.

Crystalline and noncrystalline materials, crystalline imperfections, diffusion, alloys' types, equilibrium diagrams. The Iron-Iron carbide diagram

Block B: Materials testing and correlation of the properties of a material with its microstructure. This block is mainly developed in laboratory sessions. Tensile tests, hardness tests , micro hardness tests, Charpy impact tests, metallographic microscopic, thermal shock glasses. Strain hardening, annealing. Thermal treatments in steel.

Block C: Metallic materials. Steels: fabrication, forming operations, types, properties and applications. Foundries: types, properties and applications. Non-ferrous alloys: types, properties and applications. Thermal and thermal- chemical treatments. Corrosion prevention

Block D. Ceramics: types, properties and applications. **Polymers:** types, properties and applications. **Composite materials:** types, properties and applications

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4.4.Course planning and calendar

There are three hours of class a week in the classroom.

Six 2-hour lab sessions are distributed throughout the course, there is usually a lab session every fifteen days. To evaluate 1-5 lab sessions there be two written control in the classroom and during classtime. These evaluation activities will be carried out when all the students have finished the corresponding block of practices. Practices 1,2,3 are evaluated in the first control. Practices 4,5 are evaluated in the second . Practice 6 is evaluated by a report

Material selection work will be presented in person to the teacher throughout the last week of class or in the days allocated to continuous evaluation

Group work using problem based learning methodology will be presented in person to the teachers in the days allocated to continuous evaluation

For further details concerning the timetable,classroom, laboratory sesions and further information regarding this course, pleas refer to eina.es

4.5.Bibliography and recommended resources