240EM111 - Structure, Properties and Processing of Metals and Alloys

**Coordinating unit:** 295 - EEBE - Barcelona East School of Engineering  
**Teaching unit:** 702 - CMEM - Department of Materials Science and Metallurgy  
**Academic year:** 2018  
**Degree:** MASTER’S DEGREE IN MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Teaching unit Optional)  
**ECTS credits:** 4,5  
**Teaching languages:** Spanish

### Coordinator

JESSICA CALVO MUÑOZ

### Prior skills

Basic knowledge on Physical Metallurgy

### Degree competences to which the subject contributes

**Specific:**

- CEMCEM-02. (ENG) Dissenyar i desenvolupar productes, processos, sistemes i serveis, així com l'optimització d'altres ja desenvolupats, atenent a la selecció de materials per a aplicacions específiques

**Transversal:**

- 06 URI N2. EFFECTIVE USE OF INFORMATION RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.

### Teaching methodology

This subject will be based on lectures, as well as laboratory practices, which will require the active participation and cooperation of students.

### Learning objectives of the subject

The objective of this subject is to provide students a general knowledge regarding metallic alloys of industrial interest. Common ferrous and non-ferrous alloys will be described and the relationship between their mechanical properties, heat treatments and processes will be explained, based on the structural changes that they promote. Each one of these aspects will be detailed for each of the metallic materials family.

At the end of the course, the student must be able to:

- classify the main families of metallic materials and their alloys and compare their mechanical and physical properties
- describe the hardening mechanisms active for each material and how to control them to promote a certain structure to achieve certain given properties
### Study load

<table>
<thead>
<tr>
<th>Total learning time: 112h 30m</th>
<th>Hours large group: 27h</th>
<th>24.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 13h 30m</td>
<td>12.00%</td>
</tr>
<tr>
<td>Guided activities: 0h</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Self study: 72h</td>
<td>64.00%</td>
<td></td>
</tr>
</tbody>
</table>
# 240EM111 - Structure, Properties and Processing of Metals and Alloys

## Content

<table>
<thead>
<tr>
<th></th>
<th><strong>Learning time:</strong></th>
<th><strong>Description:</strong></th>
<th><strong>Related activities:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>1h</td>
<td>Classification of metals and their alloys. Description of the main characteristics of each family of metals</td>
<td>Heat treatments lab</td>
</tr>
<tr>
<td><strong>Copper and its alloys</strong></td>
<td>6h</td>
<td>Pure copper. Brasses, alloys and applications. Bronces, alloys and applications. Other copper alloys.</td>
<td></td>
</tr>
<tr>
<td><strong>Other families</strong></td>
<td>4h</td>
<td>Superalloys. Refractory metals. Precious metals. Metallic glasses. Intermetallics. Metallic foams. Etc...</td>
<td></td>
</tr>
</tbody>
</table>
Bibliography

Basic:


