**Degree competences to which the subject contributes**

**Specific:**
- CEM1. Knowledge on several types of materials' structure, as well as analysis characterisation and techniques of materials.
- CE9. Knowledge of science, technology and materials' chemistry fundamentals. Understanding the relation between microstructure, synthesis or processing and materials' properties.
- CEMT-20. Knowledge of the mechanical, electronic, chemical and biological behaviour of materials, and the ability to apply it in designing, calculating and modelling aspects of elements, components and equipment.

**Transversal:**
- 04 COE N3. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

**Teaching methodology**

During the course theory and problems, along with experimental demonstrations are taught. Several tests are performed, as well as a presentation and laboratory.

**Learning objectives of the subject**

The aim of the course is to help students acquire basic knowledge about the physical properties of materials. At the end of the course the student should be able to:
- Understand the basics of solid state physics as well as the behaviour of electrons in solids
- Classify materials according to their electrical behavior. Relate the macroscopic electrical behavior with the behavior of electrons in materials
- Distinguish the different magnetic responses of materials. Identify key parameters of ferro magnetic and ferrimagnetic materials
295708 - PEMM - Electrical and Magnetic Properties of Materials

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>45h</th>
<th>30.00%</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>15h</td>
<td>10.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities:</td>
<td>90h</td>
<td>60.00%</td>
</tr>
</tbody>
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Content

UNIT I: Introduction to Solid State Physics

Learning time: 50h
- Theory classes: 12h
- Practical classes: 8h
- Self study: 30h

Description:

UNIT II: Electrical behavior of materials

Learning time: 50h
- Theory classes: 12h
- Practical classes: 8h
- Self study: 30h

Description:

UNIT III: Magnetic behavior of materials

Learning time: 50h
- Theory classes: 12h
- Practical classes: 8h
- Self study: 30h

Description:
Types of magnetism. Curie temperature. Ferro and ferrimagnetic materials. Domains. superconductivity

Qualification system

Final Exam 40% + 30% Partial Tests + 10% presentation + 20% lab
295708 - PEMM - Electrical and Magnetic Properties of Materials

Bibliography

Basic:


Complementary: