### 295569 - 295EQ241 - Advanced Materials

**Coordinating unit:** 295 - EEBE - Barcelona East School of Engineering  
**Teaching unit:** 713 - EQ - Department of Chemical Engineering  
**Academic year:** 2018  
**Degree:**  
**ECTS credits:** 6  
**Teaching languages:** Catalan, Spanish, English

### Teaching staff

**Coordinator:** Carlos Alemán  
**Others:** Jordi Puiggalí

### Opening hours

**Timetable:** The first day of class will be defined.

### Prior skills

Basic knowledge of materials acquired during undergraduate studies. Having studied the subject "Biotechnological Processes and Polymer Industry"

### Requirements

Degree in Chemical Engineering or equivalent

### Degree competences to which the subject contributes

**Generical:**

CGMUEQ-04. To carry out the appropriate research, undertake the design and manage the development of engineering solutions, in new or little known environments, relating creativity, originality, innovation and technology transfer  
CGMUEQ-10. Adapt to changes, being able to apply new and advanced technologies and other relevant developments, with initiative and entrepreneurial spirit

**Transversal:**

06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.  
03 TLG. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

### Teaching methodology

Classes and presentation of works.

### Learning objectives of the subject

Acquire basic knowledge about advanced materials based on technical polymers. Acquire the theoretical foundations that allow to understand and to design advanced materials. Learn to reason about structure-property relationships. Learn the reasoning schemes that are applied in the fields of research in advanced materials and their industrial use.
## Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>28h</th>
<th>18.67%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group:</td>
<td>14h</td>
<td>9.33%</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>6h</td>
<td>4.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>102h</td>
<td>68.00%</td>
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</tbody>
</table>
## Composite and hybrid materials based on polymers

**Description:**

**Related activities:**
Development and presentation of specific works on topics selected by the teaching staff.

**Specific objectives:**
Acquire basic knowledge and theoretical foundations about polymer composites and hybrid materials.

**Learning time:** 12h
Theory classes: 12h

## Conducting polymers

**Description:**

**Related activities:**
Development and presentation of specific works on topics selected by the teaching staff.

**Specific objectives:**
Acquire basic knowledge and theoretical foundations about conducting polymers.

**Learning time:** 12h
Theory classes: 12h

## Colloids, surfactants and emulsions

**Description:**
General concepts. Preparation of colloids and emulsions. Stability of emulsions and dispersions. Applications to energy storage and biomedicine.

**Related activities:**
Development and presentation of specific works on topics selected by the teaching staff.

**Specific objectives:**
Acquire basic knowledge and theoretical foundations about colloids, surfactants and emulsions.

**Learning time:** 9h
Theory classes: 9h
surfaces

**Description:**

**Related activities:**
Development and presentation of specific works on topics selected by the teaching staff.

**Specific objectives:**
Acquire basic knowledge and theoretical foundations about the chemistry of surfaces.

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**Qualification system**

NC = \( \frac{(NP1+NP2+NP3+NP4+2 \cdot E)}{6} \)
where NC is the course mark, NP1-NP4 are the notes of the for parts in which the subject is divided and E is the mark of the exam.

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**Regulations for carrying out activities**

Works and presentations drawn up by teams of two-three students depending on the number of students enrolled. The written exam will be held individually at the end of the semester. It has a minimum of 70% attendance at the classes, in order to be able to reflect the preparation of the different Works assigned to teams.

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**Bibliography**

**Basic:**
Nou llibre.

**Others resources:**
Supplied by the teaching staff.