Course guides  
295556 - 295EQ032 - Nanotechnology

Unit in charge: Barcelona East School of Engineering  
Teaching unit: 713 - EQ - Department of Chemical Engineering.

Degree: MASTER'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2019). (Compulsory subject).

Academic year: 2020  
ECTS Credits: 6.0  
Languages: Catalan, English, Spanish

LEcTURER

Coordinating lecturer: Carles Alemán

Others: Joan Torras and Francesc Estrany

PRorI S KILLS

Nanotechnology

REquirEmENTS

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

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEMUEQ-02. To design products, processes, systems and services of the chemical industry, as well as the optimization of others already developed, taking as a technological base the various areas of chemical engineering, including processes and transport phenomena, separation operations and engineering of chemical, nuclear, electrochemical and biochemical reactions
CEMUEQ-04. Ability to solve problems that are unfamiliar, ill-defined, and have opposed specifications, considering the possible solution methods, including the most innovative, selecting the most appropriate, and being able to correct the implementation, evaluating the different design solutions

General:
CGMUEQ-10. Adapt to changes, being able to apply new and advanced technologies and other relevant developments, with initiative and entrepreneurial spirit

Transversal:
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

Learn basic knowledge related to the use of polymers and biopolymers in nanotechnology. Learn the concepts that relate the structure and properties of nanostructured materials for their technological application and biotechnology

### STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>12.0</td>
<td>8.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>42.0</td>
<td>28.00</td>
</tr>
<tr>
<td>Self study</td>
<td>96.0</td>
<td>64.00</td>
</tr>
</tbody>
</table>

**Total learning time:** 150 h

### CONTENTS

**Introduction**

**Description:**

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

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

**Full-or-part-time:** 9h
Theory classes: 9h

**Nanocomposites based on nanotubes, nanofibres, nanoparticles and nanosheets**

**Description:**

**Specific objectives:**
Acquire basic knowledge and theoretical foundations about nanocomposites based on nanotubes, nanofibres, nanoparticles and nanosheets.

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

**Full-or-part-time:** 11h
Theory classes: 11h
# Polymeric nanomembranes

**Description:**
The materials for the manufacture of ultra-fine membranes. Preparation of ultra-fine membranes. Giant nanomembranes The functionalization of ultra-fine membranes. Applications of ultra-fine membranes in Electronics and Biomedicine.

**Specific objectives:**
Acquire basic knowledge and theoretical foundations about polymeric nanomembranes.

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

**Full-or-part-time:** 11h  
Theory classes: 11h  

# Polymeric nanofibers

**Description:**

**Specific objectives:**
Acquire basic knowledge and theoretical foundations about polymeric nanofibers.

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

**Full-or-part-time:** 11h  
Theory classes: 11h  

# GRADING 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.

# EXAMINATION RULES

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.

# RESOURCES

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