295022 - FP - Fundamentals of Polymers

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 702 - CMEM - Department of Materials Science and Metallurgy
Academic year: 2018
Degree: BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Maspoch Ruldua, Maria Lluïsa

Others: Santana Perez, Orlando Onofre
Cailloux, Jonathan
García Masabet, Violeta Del Valle
Klotz, Magali

Opening hours
Timetable: Monday from 17 to 18h
Tuesday from 17 to 19h

Prior skills
General knowledge of chemistry

Requirements
Structure and characterization of materials

Degree competences to which the subject contributes

Specific:
CEB-04. Understand the fundamental principles of general, organic and inorganic chemistry and apply them in engineering.
CEI-09. Understand the fundamentals of materials science, technology and chemistry. Understand the relationship between the microstructure, synthesis or processing and the properties of materials.

Transversal:
07 AAT N1. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

Teaching methodology
MD1: Expository class with material available in digital campus
MD2: Seminars and activities deliverables
MD3: Conducting laboratory practices

Learning objectives of the subject

1. Review the basic concepts of organic chemistry
2. Know the main reactions of polymerization
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3. Learn how to calculate and determine the average molecular mass of polymers
4. Know the polymer identification techniques

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>Hours medium group:</th>
<th>Hours small group:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total learning time:</td>
<td>150h</td>
<td>45h</td>
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### Principios de Química Orgánica

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 49h 40m</th>
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<tbody>
<tr>
<td>Introduction</td>
<td>Practical classes: 15h</td>
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<tr>
<td>Attractive forces</td>
<td>Laboratory classes: 2h</td>
</tr>
<tr>
<td>Isomerías</td>
<td>Guided activities: 1h</td>
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<tr>
<td>Main reactions</td>
<td>Self study : 31h 40m</td>
</tr>
</tbody>
</table>

**Related activities:**
- Practices with molecular models

### Polymers

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 105h 20m</th>
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<tbody>
<tr>
<td>Basic definitions</td>
<td>Practical classes: 30h</td>
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<tr>
<td>Polymerization reactions</td>
<td>Laboratory classes: 10h</td>
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<tr>
<td>Molecular structure</td>
<td>Guided activities: 2h</td>
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<tr>
<td>Polymerization systems</td>
<td>Self study : 63h 20m</td>
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<td>Dimensions of the chain</td>
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<tr>
<td>Identification of polymers</td>
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<td>Main reactions</td>
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<td>Dimensions of the chain</td>
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<td>Identification of polymers</td>
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**Related activities:**
1. Viscosymmetry
2. Obtaining thermoplastics (PA6.10)
3. Preparation PU foams
4. Identification by flame behavior
5. IR identification
Qualification system

The final mark (Nf) will be calculated according to the following table:
Type of evaluation: Continuous evaluation
Note deliverable activities (A) = 10%
Lab note (P) = 20%
Final Exam (EF) = 70%
Final mark (Nf): 0.1 A + 0.2 P +0.7 EF
The re-evaluation replaces the final exam grade. To be able to submit to the re-evaluation, it is necessary to have attended all the laboratory practices and submitted the corresponding reports.

Bibliography

Basic:
W. D. Callister. Introducción a la Ciencia e Ingeniería de Materiales.

Others resources:
Presentations of the classes available in atenea
Practice script available at atenea
Script of the activities available in atenea