240642 - Polymers in Industry

Degree competences to which the subject contributes

Specific:
1. Knowledge on several types of materials' structure, as well as analysis characterisation and techniques of materials.
2. Knowledge and application of materials' technology in the following fields: production, transformation, processing, selection, control, maintenance, recycling, and storage of any type of materials.
3. Capacity to apply the scientific method to solve laboratory problems in the chemical and chemical engineering environment.

Transversal:
4. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
5. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.
6. 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.
7. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
8. 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.

Learning objectives of the subject

1. To gain an understanding of the chemical structure of industrial polymers, their classification and nomenclature.
2. To acquire knowledge about the basic properties of polymers and how they relate to the chemical and physical structure.
3. To acquire knowledge about the chemical processes of manufacture and processing of polymers.
4. To acquire a general knowledge of major industrial polymeric materials, their properties and applications.
5. To acquire a knowledge of advanced polymeric materials and research strategies that apply to its technical
## Study load

<table>
<thead>
<tr>
<th></th>
<th>Hours large group:</th>
<th>Hours medium group:</th>
<th>Hours small group:</th>
<th>Guided activities:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong></td>
<td>112h 30m</td>
<td>0h</td>
<td>45h</td>
<td>0h</td>
<td>67h 30m</td>
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## Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time: 6h</th>
<th>Description:</th>
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<tbody>
<tr>
<td><strong>Introduction to polymers. Constitution and classification.</strong></td>
<td></td>
<td>Composition, constitution and configuration. Classification and nomenclature. Characterization of the chemical structure. Molecular weights and their distribution.</td>
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<tr>
<td><strong>Structure and basic properties.</strong></td>
<td>Learning time: 14h</td>
<td>Solubility, diffusion and permeability of polymers. The amorphous state and the crystalline state. Thermal properties. Mechanical properties. Rheology of polymers.</td>
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<tr>
<td><strong>Polymer technology</strong></td>
<td>Learning time: 12h</td>
<td>Polymer formulation: fillers, plasticizers and other additives. Processing of polymers: moulding, injection and extrusion. Fibres and spinning processes. Elastomer technology.</td>
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### Bibliography

#### Basic:

