Degree competences to which the subject contributes

**General:**
- CGMUEQ-06. Have the capacity to analyze and synthesize the continuous progress of products, processes, systems and services using safety, economic viability, quality and environmental management criteria
- CGMUEQ-10. Adapt to changes, being able to apply new and advanced technologies and other relevant developments, with initiative and entrepreneurial spirit

**Transversal:**
- 02 SCS. SUSTAINABILITY AND SOCIAL COMMITMENT. Being aware of and understanding the complexity of social and economic phenomena that characterize the welfare society. Having the ability to relate welfare to globalization and sustainability. Being able to make a balanced use of techniques, technology, the economy and sustainability.
- 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

Exhibition classes and presentation of works

Learning objectives of the subject

Specific:
- CEMQ1. Apply knowledge of mathematics, physics, chemistry, biology and other natural sciences, obtained through study, experience, and practice, with critical reasoning to establish economically viable solutions to technical problems.
- CEMQ9. Manage Research, Development and Technological Innovation, taking into account the transfer of technology and property and patent rights.
- CEMQ13. Realization, presentation and defense, once all the credits of the syllabus have been obtained, from an original exercise carried out individually before a university court, consisting of a comprehensive project of Chemical Engineering of a professional nature in which the competences acquired in the teachings are synthesized.

Generic:
- CGMUEQ4. Carrying out the appropriate research, undertake the design and lead the development of engineering solutions, in new or unfamiliar environments, relating creativity, originality, innovation and technology transfer.
CGMQ6. Be able to analyze and synthesize the continuous progress of products, processes, systems and services using criteria of safety, economic viability, quality and environmental management.

CGMQ11. Possess the skills of autonomous learning to maintain and improve the skills of chemical engineering that allow the continuous development of the profession

Transversal:

CT3. TEAMWORK: Being able to work as a member of an interdisciplinary team, either as a member or performing management tasks, in order to contribute to develop projects with pragmatism and sense of responsibility, assuming commitments taking into account the resources available

<table>
<thead>
<tr>
<th>Study load</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>150h</td>
<td>28h</td>
<td>0h</td>
<td>14h</td>
<td>102h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18.67%</td>
<td>0.00%</td>
<td>9.33%</td>
<td>68.00%</td>
</tr>
</tbody>
</table>
## Content

| 1. Biopolymers and bioplastics | **Learning time:** 2h  
Theory classes: 2h |
|------------------------------|-------------------|
| **Description:**  

| 2. Biomaterials and biocompatibility | **Learning time:** 2h  
Theory classes: 2h |
|-------------------------------|-------------------|
| **Description:**  

| 3. Biostenibilidad and biodegradability | **Learning time:** 5h  
Theory classes: 5h |
|-----------------------------------|-------------------|
| **Description:**  

| 4. Sustainable monomers | **Learning time:** 3h  
Theory classes: 3h |
|------------------------|-------------------|
| **Description:**  

| 5. Sustainable polymers and bioplastics | **Learning time:** 5h  
Theory classes: 5h |
|----------------------------------------|-------------------|
| **Description:**  
<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Learning time</th>
<th>Theory classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Nanostructured polymers and copolymers</td>
<td>Biopolymers of technological interest: starch and cellulose. Protein biopolymers. Modifications and industrial applications. Bacterial polymers: polyesters and polysaccharides. Industrial applications Economic aspects.</td>
<td>3h</td>
<td>3h</td>
</tr>
<tr>
<td>7. Polymeric biomaterials</td>
<td>Surgical sutures. Adhesives Polymeric cements Dental restorations and implants. Hydrogels Contact lenses. Artificial skin Polymers in pharmaceutical tablets. Controlled release of drugs.</td>
<td>6h</td>
<td>6h</td>
</tr>
<tr>
<td>8. Advanced bioplastics</td>
<td>New biocomposites based on bioplastics. Flexible and low migration bioplastics. Hybrid bioplastics. Sustainable coatings based on bioplastics: paints and plastic coatings.</td>
<td>5h</td>
<td>5h</td>
</tr>
<tr>
<td>9. Bioplastics based on peptides and polypeptides</td>
<td>Bioplastics based on polypeptides. Bioplastics obtained from self-assembly of peptides: Peptide materials. Conjugated bioplastics.</td>
<td>5h</td>
<td>5h</td>
</tr>
</tbody>
</table>
Qualification system

NC = (NP1 + NP2 + NP3) / 3
Where NC is the course grade and NP1-NP3 are the marks of the three parts in which the subject is divided.

Regulations for carrying out activities

Exam: It consists of different theoretical and practical questions related to the content of the subject.

Bibliography

Basic:

