Degree competences to which the subject contributes

Specific:
CEMEI04. Ability for the analysis and design of chemical processes.

Teaching methodology

LECTURES
During the spring term of the course 2019-2020, and as a consequence of the health crisis due to the Covid19, the teaching method will be:

- Videos of the different course chapters
- Online exercises to practice
- Online doubts sessions
- Exercises to be delivered through an atenea task, uploading later the solutions.
- Continual evaluation questionnaires
- Final exam

Normal situation:

Description: Explain the contents of this subject.
Support material: Slides, exercises and papers. All the material is available online (atenea).
Description of the assignments due and their relation to the assessment: Continuous test. Mid-term exam. Final exam.
Specific objectives: To comply with those set in this subject.

Learning objectives of the subject

The specific objectives of this subject are:
1. Make the student aware of the diversity of products and industries related with the industrial chemistry.
2. Identify the raw materials and intermediate products used in the chemical production at large scale.
3. Understand the different physicochemical processes that allow the transformation of these raw materials to a final product.
4. Describe relevant processes for the chemical industry.
5. Value the importance of maintenance and other related services for the proper functioning of the chemical plants.

**Study load**

<table>
<thead>
<tr>
<th><strong>Total learning time:</strong> 112h 30m</th>
<th>Hours large group: 27h</th>
<th>24.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 13h 30m</td>
<td>12.00%</td>
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<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 72h</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Chapter 1. Introduction</th>
<th>Learning time: 3h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td>Chemical industry importance at Spanish level and at a global scale. Concept of Unit Operation. Definition of chemical process and the important factors for its success: continuous and discontinuous processes, flow diagram, PID. Storage and transport. Main natural sources of raw materials for the chemical industry: lithosphere, hydrosphere, atmosphere and biosphere.</td>
<td></td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td></td>
</tr>
<tr>
<td>Lectures (2h)</td>
<td></td>
</tr>
<tr>
<td>1 paper to read at home</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>Objectives: 1, 2.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 2. Maintenance and auxiliary services</th>
<th>Learning time: 4h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td>Maintenance importance for the chemical industry. Maintenance types and function. Introduction to other practical aspects of the industry (subcontracting, communication, management, etc.). Auxiliary services: steam, vacuum, compressed air, nitrogen, etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td></td>
</tr>
<tr>
<td>Lectures (2h)</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>Objective: 5.</td>
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</table>

<table>
<thead>
<tr>
<th>Chapter 3. Distillation</th>
<th>Learning time: 19h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td></td>
</tr>
<tr>
<td>Lectures (7h)</td>
<td></td>
</tr>
<tr>
<td>Practical exercises</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>Objective: 3.</td>
<td></td>
</tr>
</tbody>
</table>
### Chapter 4. Petroleum and Petrochemical Industry

**Learning time:** 17h  
Theory classes: 8h  
Self study : 9h

**Description:**  

**Related activities:**  
Lectures (6h)  
Practical exercises  
2 papers to read at home

**Specific objectives:**  
Objectives: 2, 3 and 4.

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### Chapter 5. Kinetics and reactors

**Learning time:** 24h  
Theory classes: 8h  
Self study : 16h

**Description:**  

**Related activities:**  
Lectures (8h)  
Practical exercises

**Specific objectives:**  
Objective: 3
Chapter 6. Membrane technology

**Description:**

**Related activities:**
Lectures (6h)
Practical exercises

**Specific objectives:**
Objective: 3

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Chapter 7. Chlor-Alkali industry

**Description:**

**Related activities:**
Lectures (2h)
1 paper to read at home

**Specific objectives:**
Objectives: 2, 3 and 4

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Chapter 8. Other industries

**Description:**
Short description of production process of diverse chemical industries such as: Fertilizers industry, Detergents industry, Polimers industry, Paper industry, Cement industry, etc.

**Related activities:**
Lectures (6h)
Practical exercises
Visits to a chemical plants (4h)

**Specific objectives:**
Objectives: 2, 3 and 4
During the spring term of the course 2019-2020, and as a consequence of the health crisis due to the Covid19, the qualification method would be:

Questionnaire 1 (Q1): 10%
Questionnaire 2 (Q2): 20%
Questionnaire 3 (Q3): 10%
Exercises to be delivered (EE): 15%
Final Exam (EF): 45%
Final Qualification (NF) = 0,1*Q1+0,2*Q2+0,1*Q3+0,15*EE+0,45*EF

Normal situation:

Continuous evaluation tests (PAC): 15% of the final qualification
Mid-term exam (EP): 35% of the final qualification
Final exam (EF): 50% of the final qualification
Final qualification (NF): NF = 0.15*PAC + 0.35*EP + 0.50*EF

Regulations for carrying out activities

The mid-term exam eliminates content, which is not recovered with the final exam. The reevaluation exam will substitute the qualification obtained in the partial and final exams. The continuous tests are not reevaluated.
You will not be able to take notes with you at the exam, only the subject form for the problems part. Programmable calculator will only be used in the tests when you are explicitly informed.
Bibliography

Basic:


Complementary:


