Course guides
295901 - EII - Industrial Equipments and Installations

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

Degree: BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).

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

LECTURER

Coordinating lecturer: José Ignacio Iribarren Laco

Others: Primer quadrimestre:
ELAINE APARECIDA ARMELIN DIGGROC - M11, M12
GEORGINA FABREGAT JOVÉ - M11, M12
JOSE IGNACIO IRIBARREN LACO - M11, M12

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Capacity to understand and apply basic knowledge principles of general chemistry, organic and inorganic chemistry and their engineering applications.

TEACHING METHODOLOGY

Learning based in expositive lessons by using the resources available in Atenea campus and cooperative learning in practice sessions oriented to exercises resolution.

LEARNING OBJECTIVES OF THE SUBJECT

Apply the knowledge of mathematics and electrochemistry to study the corrosion. Design equipment and plants in chemical industry with efficiency and economic criteria.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>50,0</td>
<td>33.33</td>
</tr>
<tr>
<td>Hours small group</td>
<td>10,0</td>
<td>6.67</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h
## Introduction. Chemical industry characteristics.

**Description:**
General characteristics of chemical industry. Equipment and general installations. Associated problematic to the chemical plant.

**Specific objectives:**
Knowledge of the general characteristics of a chemical industry.

**Full-or-part-time:** 3h  
Theory classes: 2h  
Self study : 1h

## Thermodynamic basis of the corrosion.

**Description:**

**Specific objectives:**
To obtain the thermodynamic basis of corrosion and apply the Pourbaix diagrams to predict the possibility of corrosion.

**Related activities:**
Exercises session.

**Full-or-part-time:** 10h  
Theory classes: 4h  
Practical classes: 4h  
Self study : 2h

## Corrosion kinetics.

**Description:**

**Specific objectives:**
To obtain the kinetics implications in corrosion processes and apply to different factors afectting to corrosion rate.

**Related activities:**
Exercise session.

**Full-or-part-time:** 7h  
Theory classes: 3h  
Practical classes: 2h  
Self study : 2h
## Types of corrosion. Protection against corrosion.

**Description:**
Environmental, water, soils and microbiological corrosion. Galvanic, homogeneous and located (pitting) corrosion. Stress corrosion cracking. Cathodic protection, metallic and plastic coatings.

**Applications to Chemical Industry:**

**Specific objectives:**
To distinguish the different types of corrosion related with the morphology and properties of metals and alloys.

**Related activities:**
Exercice session. Team work and visit to Galvanizados Tenas.

**Full-or-part-time:** 6h  
Theory classes: 2h  
Practical classes: 2h  
Self study: 2h

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## Materials properties.

**Description:**

**Specific objectives:**
To study the main properties of materials which can be used in chemical industry.

**Related activities:**
Exercice session.

**Full-or-part-time:** 6h  
Theory classes: 2h  
Practical classes: 2h  
Self study: 2h

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## Materials selection.

**Description:**
Materials selection criteria. Application to apparatus and equipment of chemical industry.

**Specific objectives:**
To establish the basis of materials selection criteria in chemical industry.

**Related activities:**
Exercice session.

**Full-or-part-time:** 6h  
Theory classes: 2h  
Practical classes: 2h  
Self study: 2h
## Costing and project evaluation.

**Description:**

**Specific objectives:**
To study preliminarily the investment analysis and associated costing in chemical industry.

**Related activities:**
Exercise session.

**Full-or-part-time:** 6h
- Theory classes: 2h
- Practical classes: 2h
- Self study: 2h

## Mechanical design.

**Description:**

**Specific objectives:**
To study the basis of mechanical design of vessels under pressure and storage tanks.

**Related activities:**
Exercise session.

**Full-or-part-time:** 6h
- Theory classes: 2h
- Practical classes: 2h
- Self study: 2h

## GRADING SYSTEM

Evaluation system includes:
- a) Exercises resolution in continuous evaluation (25% of final qualification)
- b) Laboratory sessions evaluation (10% of final qualification).
- c) Complementary activities like seminars, expositions and guided works (15% of final qualification).
- d) Final examination (50% of final qualification).

Reevaluation will replace the qualification of final examen, remaining unchanged the continuous evaluation.

## EXAMINATION RULES.

Additional material is allowed in examination in accordance with the criteria of the professor.

## BIBLIOGRAPHY

**Basic:**
Complementary: