295901 - EII - Industrial Equipments and Installations

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering
Academic year: 2019
Degree: BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 6

Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: 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>Total learning time: 150h</th>
<th>Hours large group: 50h 33.33%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h 0.00%</td>
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<td></td>
<td>Hours small group: 10h 6.67%</td>
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<tr>
<td></td>
<td>Guided activities: 0h 0.00%</td>
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<tr>
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<td>Self study: 90h 60.00%</td>
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### 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.

**Learning time:** 3h
- Theory classes: 2h
- Self study: 1h

### Thermodynamic basis of the corrosion.

**Description:**

**Related activities:**
Exercises session.

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

**Learning time:** 10h
- Theory classes: 4h
- Practical classes: 4h
- Self study: 2h

### Corrosion kinetics.

**Description:**

**Related activities:**
Exercise session.

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

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

**Learning time:** 6h
- **Theory classes:** 2h
- **Practical classes:** 2h
- **Self study:** 2h

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

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

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

### Materials properties.

**Learning time:** 6h
- **Theory classes:** 2h
- **Practical classes:** 2h
- **Self study:** 2h

**Description:**

**Related activities:**
Exercice session.

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

### Materials selection.

**Learning time:** 6h
- **Theory classes:** 2h
- **Practical classes:** 2h
- **Self study:** 2h

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

**Related activities:**
Exercice session.

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

**Learning time:** 6h
- Theory classes: 2h
- Practical classes: 2h
- Self study: 2h

**Description:**

**Related activities:**
Exercise session.

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

Mechanical design.

**Learning time:** 6h
- Theory classes: 2h
- Practical classes: 2h
- Self study: 2h

**Description:**

**Related activities:**
Exercise session.

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

Qualification 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 exam (50% of final qualification).
Reevaluation will replace the qualification of final exam, remaining unchanged the continuous evaluation.

Regulations for carrying out activities

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

Basic:


Complementary:
