Course guide
295712 - DCD - Wear, Corrosion and Degradation

Unit in charge: Barcelona East School of Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering.
702 - CEM - Department of Materials Science and Engineering.

Degree: BACHELOR’S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2023   ECTS Credits: 6.0   Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: JOSE IGNACIO IRIBARREN LACO

Others: Segon quadrimestre:
ELAINE APARECIDA ARMELIN DIGGROC - M10
FERHUN CEM CANER - M10
NÚRIA CINCA I LUIS - M10
JOSE IGNACIO IRIBARREN LACO - M10

REQUIREMENTS

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEMT-20. Knowledge of the mechanical, electronic, chemical and biological behaviour of materials, and the ability to apply it in designing, calculating and modelling aspects of elements, components and equipment.

CEMT-24. Knowledge of and the capacity for the evaluation of the safety, durability and structural integrity of materials and components that are manufactured with these materials.

Transversal:
06 URI N3. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
05 TEQ N3. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

TEACHING METHODOLOGY

Two methodologies will be applied during the lessons:
a) Expositive method by using the material available in platform Atenea
b) Exercises resolution in groups formed by 3-4 students by means cooperative work in classroom. Individual evaluation will be carried out at the end of the session.
c) Cooperative learning
LEARNING OBJECTIVES OF THE SUBJECT

The main objective is to prepare specialists technics in corrosion in order to avoid the economics loss in public and private enterprises.
Specific objectives:
Know the thermodynamic and kinetics basis of the corrosion.
Anticipate the corrosion and apply the
Study and diagnose different types of corrosion.
Select suitably the corrosion-resistant materials.
Corrosion prevention and protection solutions.
Know the basic fundamental of wear, degradation and corrosion.
Study and diagnose different types of wear, degradation and corrosion.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>60,0</td>
<td>40.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

1. Introduction. Corrosion basics. Thermodynamic aspects. Nernst equation

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


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


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

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


**Full-or-part-time:** 4h
- Theory classes: 1h
- Practical classes: 1h
- Self study: 2h


**Full-or-part-time:** 6h 30m
- Theory classes: 2h 30m
- Practical classes: 2h
- Self study: 2h

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**Chapter 7**

**Description:**

**Full-or-part-time:** 12h
- Theory classes: 4h
- Practical classes: 4h
- Self study: 4h

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**Chapter 8**

**Description:**

**Full-or-part-time:** 5h 30m
- Theory classes: 2h
- Practical classes: 2h
- Self study: 1h 30m
Chapter 9

Description:

Full-or-part-time: 17h
Theory classes: 6h
Practical classes: 5h
Self study: 6h

ACTIVITIES

CONTINUOUS EVALUATION 1

Description:
Exercises resolution of unit 1

Specific objectives:
Evaluation of the exercises sesion profit

Material:
Work exercises of unit 1

Delivery:
At the end of the sesion

Full-or-part-time: 2h
Theory classes: 2h

CONTINUOUS EVALUATION 2

Description:
Exercises resolution of unit 2

Specific objectives:
Evaluation of the exercises sesion profit

Material:
Work exercises of unit 2

Delivery:
At the end of the sesion

Full-or-part-time: 2h
Theory classes: 2h
### CONTINUOUS EVALUATION 3

**Description:**
Exercises resolution of unit 3

**Specific objectives:**
Evaluation of the exercises sesion profit

**Material:**
Work exercises of unit 3

**Delivery:**
At the end of the sesion

**Full-or-part-time:** 2h
Theory classes: 2h

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### CONTINUOUS EVALUATION 4

**Description:**
Exercises resolution of unit 4

**Specific objectives:**
Evaluation of the exercises sesion profit

**Material:**
Work exercises of unit 4

**Delivery:**
At the end of the sesion

**Full-or-part-time:** 2h
Theory classes: 2h

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### CONTINUOUS EVALUATION 5

**Description:**
Exercises resolution of unit 5

**Specific objectives:**
Evaluation of the exercises sesion profit

**Material:**
Work exercises of unit 5

**Delivery:**
At the end of the sesion

**Full-or-part-time:** 2h
Theory classes: 2h
CONTINUOUS EVALUATION 6

Description:
Exercises resolution of unit 6

Specific objectives:
Evaluation of the exercises sesion profit

Material:
Work exercises of unit 6

Delivery:
At the end of the sesion

Full-or-part-time: 2h
Theory classes: 2h

CONTINUOUS EVALUATION 7

Description:
Presentation of real cases

Specific objectives:
Evaluation of the unit 7 profit

Delivery:
Programmed by the professor

Full-or-part-time: 2h
Theory classes: 2h

CONTINUOUS EVALUATION 8

Description:
Presentation of real cases

Specific objectives:
Evaluation of the unit 8 profit

Delivery:
Programmed by the professor

Full-or-part-time: 2h
Theory classes: 2h

CONTINUOUS EVALUATION 9

Description:
Presentation od real cases

Specific objectives:
Evaluation of the unit 9 profit

Delivery:
Programmed by the professor

Full-or-part-time: 2h
Theory classes: 2h
GRADING SYSTEM

The two parts of the contents, Corrosion on the one hand and Wear and Degradation on the other hand, are evaluated separately (50% by part).

When the part of Corrosion is finished, there is one eliminatory exam. If this exam is overcome, this part will not be evaluated in the final exam. If this part is not overcome, must be evaluated in the final exam.

In each part, the activities corresponding to continuous evaluation will have a weight of 40% in final qualification, being the 60% corresponding to the exam.

Continuous evaluation of the exercises sessions and other activities proposed by the professor.

Reevaluation will replace the qualification of final examen, remaining unchanged the continuous evaluation. The students will be able to access the re-assessment test that meets the requirements set by the EEBE in its Assessment and Permanence Regulations [https://eebe.upc.edu/ca/estudis/normatives-academiques/documents/eebe-normativa-avaluacio-i-permanencia-18-19-aprovat-je-20-18-06-13.pdf]

EXAMINATION RULES.

Complementary material will be available for the student during the proves if it is specifically indicated by the professor.

BIBLIOGRAPHY

Basic:

Complementary: