Course guides
280695 - 280695 - Inspection, Maintenance and Repair of Electric Facilities

Unit in charge: Barcelona School of Nautical Studies
Teaching unit: 709 - DEE - Department of Electrical Engineering.
Degree: BACHELOR’S DEGREE IN MARINE TECHNOLOGIES (Syllabus 2010). (Optional subject).
BACHELOR’S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).

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

LECTURER

Coordinating lecturer: VICTOR FUSES NAVARRA

Others: Primer quadrimestre:
VICTOR FUSES NAVARRA - DT, GESTN, GTM

REQUIREMENTS

To register this subject, it must be approved: 280665 Electrical Plant of the Ship, or, 280660 Electric propulsion and power electronics.

TEACHING METHODOLOGY

· Analysis of real applications.
· Receive, understand and synthesize knowledge.
· Define and solve problems.
· Develop the reasoning and critical spirit, and defend it in an oral or written way.

LEARNING OBJECTIVES OF THE SUBJECT

· Understand and apply the standards or technical regulations.
· Use the electrical diagrams as an inspection and maintenance tool.
· Know the different types of maintenance that can be applied.
· Apply procedures for early detection of breakdowns
· Knowledge about safety procedures
· Understand the properties of the materials of the electrical installations.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>10,0</td>
<td>6.67</td>
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<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>15,0</td>
<td>10.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>5,0</td>
<td>3.33</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h
## Electric Technical Regulations

**Description:**

**Specific objectives:**
Use of technical language. Identification of deficiencies in a facility.

**Related activities:**
Drafting of technical report of deficiencies of a facility based on a selection of standards.

**Full-or-part-time:** 8h
Theory classes: 6h
Practical classes: 2h

## Electrical diagrams as an inspection, maintenance and repair tool

**Description:**
Standardized symbology. Types of schemes. Modification, revision and approval of the electrical diagrams. Examples.

**Specific objectives:**
Interpretation and use of electrical diagrams.

**Related activities:**
Elaboration of the scheme of an installation.

**Full-or-part-time:** 8h
Theory classes: 6h
Guided activities: 2h

## Maintenance

**Description:**

**Related activities:**
Writing a maintenance plan.

**Full-or-part-time:** 8h
Theory classes: 4h
Practical classes: 2h
Guided activities: 2h
**Premature fault detection**

**Description:**

**Specific objectives:**
Programming of a PLC.

**Related activities:**
Programming of a PLC for automatic recording of periodic voltage and current readings of lead batteries.

**Full-or-part-time:** 6h
- Theory classes: 2h
- Practical classes: 4h

**Behavior of materials**

**Description:**
Study of the behavior of the usual materials of the electrical installations from 5 points of view: electrical, dielectric, magnetic, mechanical and thermal. Types of conductors. High voltage and high current tests.

**Specific objectives:**
Acquire skills in the essay of materials. Correct handling of the oscilloscope.

**Related activities:**
Participate in the testing of conductors and insulators. Writing a report of the essays.

**Full-or-part-time:** 6h
- Theory classes: 4h
- Practical classes: 2h

**Operation in degraded modes**

**Description:**
Relationship between the maintenance plan and the emergency plan. Technical limits of engines, generators, installations, protections and materials. Reversible overload and destructive overload.

**Related activities:**

**Full-or-part-time:** 5h
- Practical classes: 5h

**Repairs.**

**Description:**
Practical troubleshooting sessions, repair study, and repair.

**Specific objectives:**
Autonomy, critical sense. Use of equemes.

**Related activities:**
Repair of different devices, equipment ... according to availability.

**Full-or-part-time:** 10h
- Laboratory classes: 10h
Safety procedures

Description:

Related activities:
Study of leakage currents in an installation.

Full-or-part-time: 9h
Theory classes: 8h
Guided activities: 1h

ACTIVITIES

Complete maintenance plan

Description:
Preparation of a complete maintenance plan for a machine or installation of free choice, with temporary, economic, material planning and evaluation criteria for the degree of execution of maintenance. It must include a risk assessment.

Specific objectives:
Oral and written expression.

Delivery:
Before final exam, the work must be defended orally in class.

Full-or-part-time: 20h
Self study: 20h

GRADING SYSTEM

The final grade is the sum of the following partial grades:

\[ N_{final} = 0.3 \times N_{pf} + 0.4 \times N_{ac} + 0.3 \times N_{eL} \]

N_{final}: final grade.
N_{pf}: final evaluation grade.
N_{ac}: grade for continuous evaluation and directed activities.
N_{eL}: grade of practical activities / laboratory evaluation.

The continuous evaluation consists of different cumulative activities, both individual and group, of a formative nature, carried out during the course (in the classroom and outside it), exams, work, etc.

EXAMINATION RULES.

· It will be an indispensable requirement to pass the subject, to approve the practical activities / laboratory (N_{eL} > 5).
· If one of the practical activities or continuous assessment is not carried out, it will be considered as not punctuated.
· It will be considered Not submitted: Who has not attended or has a global grade less than 0.5 points.
· In no case, any type of form can be available in the learning controls or tests.
· Only calculators and pens are allowed in exams.
· The use of cell phones in class is not allowed.

RESOURCES
Other resources:
- Notes and articles contributed by the teacher
- Regulations of Classification Societies
- Dossiers of manufacturers: Electra Molins, ABB, Siemens, Schneider Electric.