280659 - Inspection and Non-Destructive Testing

Coordinating unit: 280 - FNB - Barcelona School of Nautical Studies
Teaching unit: 742 - CEN - Department of Nautical Sciences and Engineering
Academic year: 2020
Degree: BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN MARINE TECHNOLOGIES (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN MARINE TECHNOLOGIES/BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2016). (Teaching unit Compulsory)
ECTS credits: 4,5
Teaching languages: Catalan, Spanish

Opening hours
Timetable: Tuesday from 10 to 14
Wednesday from 12 to 14

Requirements
Have the following subjects approved:
280642 GEM; 280643 GEM / GESTN; 280646 GEM / GESTN; 280652 GEM; 280653 GEM; 280654 GEM; 280655 GEM;
280656 GEM; 280663 GESTN; 280664 GESTN; 280666 GESTN; 280667 GESTN; 280668 GESTN; 280669 GESTN; 280671
GESTN; 280674 GESTN.

Degree competences to which the subject contributes
Specific:
2. Knowledge of inspection procedures and the functioning of the Classification Societies.
Transversal:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral
presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and
grammatical errors.

Teaching methodology
- Lectures for theory (expository method) and laboratory sessions for practices (demonstration method).
- Use of ICT and teaching support platform ATENEA.

Learning objectives of the subject
On the other hand, one of the objectives of this subject is provide the knowledge, understanding and proficiency of the
competency ?NAME OF THE COMPETENCY STCW ATTACHED TABLE OF SUBJECTS?, competency required and defined in
Section A-III/1 Mandatory minimum requirements for certification of officers in charge of an engineering watch in a
manned engine-room or designated duty engineer in a periodically unmanned engine-room (propulsion power of 750 kW
or more) of the Seafarers? Training, Certification and Watchkeeping (STCW) International Code.
# Study load

<table>
<thead>
<tr>
<th>Total learning time: 112h 30m</th>
<th>Hours large group: 25h</th>
<th>22.22%</th>
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<tbody>
<tr>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Hours small group:</td>
<td>20h</td>
<td>17.78%</td>
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<tr>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td>Self study:</td>
<td>67h 30m</td>
<td>60.00%</td>
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(ENG) PENETRANT TESTING

**Description:**

**THEORY PROGRAM:**

- Introduction to the terminology, purpose and history of the end.
- Physical principles of the method and associated knowledge.
- Security and environmental conditions.
- Knowledge about the product and capacity of the method and its derivative techniques.
- Team.
- Information previous to the test.
- Valuation.
- Essays.
- Evaluation and report.
- Innovations.
- Quality Aspects.

**PROGRAM OF LABORATORY PRACTICES:**

- Identification of defects in parts and test specimens with real and artificial discontinuities; macrographs.
- Selection of suitable materials for an assay.
- Management of: aerosols; thermometers; white light meters; black light intensity meters; use of UV-A light; standard blocks and comparators.
- Writing written instructions: exercises.
- Test with visible penetrant liquids removable with water (Method A, Type II).
- Test with visible penetrant liquids removable with solvent (Method C, Type II).
- Test with fluorescent penetrating liquids removable with water (Method A, Type I).
- Test with solvent-removable fluorescent penetrant liquids (Method C, Type I).
- Test with post-emulsifiable fluorescent penetrant liquids (Method D, Type I).
- Evaluation of discontinuities according to acceptance or rejection criteria.
- Writing the test report. Formats.
- Management and application of applicable regulations.

**Note:** The agenda includes the contents of ISO / TR 25107: 2006.

**Related activities:**

- Delivery of the study activities associated with the subject and carrying out the corresponding tests.
- Delivery of the report of the laboratory practice (s) corresponding to the type and test technique carried out.

**Specific objectives:**

- Select the ideal method and technique.
- Get your own indication.
- Interpret and evaluate said indication.
- Report the results of the trial.
(ENG) MAGNETIC PARTICLE TESTING

Learning time: 1h
Theory classes: 1h

Description:

THEORY PROGRAM:
- INTRODUCTION TO THE TERMINOLOGY, HISTORY OF THE END.
- PHYSICAL PRINCIPLES OF THE METHOD AND ASSOCIATED KNOWLEDGE
- KNOWLEDGE ABOUT THE PRODUCT AND CAPACITY OF THE METHOD AND ITS DERIVATIVE TECHNIQUES.
- TEAM
- INFORMATION PREVIOUS TO THE TEST.
- TEST.
- EVALUATION AND REPORT.
- VALUATION.
- ASPECTS ON QUALITY.
- SECURITY AND ENVIRONMENTAL CONDITIONS
- PROGRESS

LABORATORY PRACTICES:

- VISUALIZATION OF THE MAGNETIC FIELD CREATED BY A PERMANENT MAGNET.
- CONTACT WITH DIFFERENT TYPES AND COLORATIONS OF PARTICLES.
- PREPARATION OF HUMID PARTICLE BATHS AND USE OF THE CENTRIFUGAL TUBE.
- USE AND REMOVAL OF THE CONTRAST LACQUER
- DESCRIPTION AND HANDLING OF YUGOS OF CONTINUOUS AND ALTERNATE CURRENT.
- CALCULATION OF MAGNETIZATION CURRENTS FOR DIFFERENT TECHNIQUES.
- UTILIZATION OF THE BERTHOL CROSS.
- USE OF THE KETOS RING
- USE OF RESIDUAL MAGNETIC FIELD METERS
- MAGNETIZATION THROUGH COIL.
- MAGNETIZATION THROUGH POINT OF CONTACT.
- MAGNETIZATION THROUGH FIXED BED.
- DEMAGNETIZATION PROCESSES
- EMPLOYMENT OF BLACK LIGHT.
- MEASUREMENTS OF TEMPERATURE AND LIGHTING.
- EXAMINATION OF DIFFERENT PROBES USING DIFFERENT TEST TECHNIQUES.
- ACCEPTANCE CRITERIA ACCORDING TO DIFFERENT REGULATIONS.
- ELABORATION OF TEST REPORTS.
- ELABORATION OF TECHNICAL INSTRUCTIONS

Note: The agenda includes the contents of ISO / TR 25107: 2006:

Related activities:
- Delivery of the study activities associated with the subject and carrying out the corresponding tests.
- Delivery of the report of the laboratory practice (s) corresponding to the type and technique of the test carried out

Specific objectives:
- Select the ideal method and technique.
- Get your own indication.
- Interpret and evaluate said indication.
- Report the results of the trial.
### (ENG) ULTRASONIC TESTING

**Learning time:** 1h  
Theory classes: 1h

**Description:**
THEORY PROGRAM:
- INTRODUCTION, OBJECT AND HISTORY OF ULTRASOUND-PHYSICAL PRINCIPLES
- ULTRASOUND INSPECTION TECHNIQUE
- EQUIPMENT AND ACCESSORIES
- DEFECTOLOGY
- TECHNICAS OF TEST AND EVALUATION OF THE INDICATIONS-
  - REFERENCE DOCUMENTS AND REPORTS-EVALUATION AND WELDING REPORTS
- QUALITY ASPECTS

PROGRAM OF LABORATORY PRACTICES:
- Documentary support: Procedures; rules; Reports and preparation written instructions.
- Verification of the equipment s / 12668-3. Calibration blocks.
- Calibration and adjustment operations: V1, V2, etc.
- Practices with normal probe.
- Practices with angle probe
- Practices with bicristal probe.
- Exploration of type test tubes.
- Detection, location and sizing techniques. Exercises.

**Related activities:**
- Delivery of the study activities associated with the subject and carrying out the corresponding tests.
- Delivery of the report of the laboratory practice (s) corresponding to the type and test technique carried out.

**Specific objectives:**
- Select the ideal method and technique.
- Get your own indication.
- Interpret and evaluate said indication.
- Report the results of the trial.
Qualification system

The final grade is the sum of the following grades:

\[ N_{\text{final}} = 0.50 \times N_{\text{Theory}} + 0.50 \times N_{\text{Practices Lab}}. \]

- \( N_{\text{final}} \): final grade.
- \( N_{\text{parcial Theory}} \): qualification of theory tests (tests).
- \( N_{\text{parcial Lab. Practices}} \): qualification of laboratory practices.

Regulations for carrying out activities

- If you do not do any of the activities of laboratory or continuous evaluation, it will be considered as unrated.
- Those students who are in the conditions established by the Center to be able to present themselves to the re-evaluation exam, will have to present only of the suspended part.
- Note: The student will be assigned to a group of laboratory practices at the time of enrollment and no changes will be allowed during the course. Only in exceptional cases will the responsible professor assign the groups.
Bibliography

Basic:


Others resources:

- penetrating dye
- electromagnetic yoke
- equipment of tips and coil
- Thermographic camera
- UV light
- microscopes