280605 - Fundamentals of Mathematics II

Coordinating unit: 280 - FNB - Barcelona School of Nautical Studies
Teaching unit: 749 - MAT - Department of Mathematics
Academic year: 2019
Degree: BACHELOR’S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010).
ECTS credits: 6
Teaching languages: Catalan

Teaching staff

Coordinator: JOAN CARLES LARIO LOYO - Q1
MARIA MONTSERRAT VELA DEL OLMO - Q2

Others:
Primer quadrimestre: JOAN CARLES LARIO LOYO

Segon quadrimestre: MARIA MONTSERRAT VELA DEL OLMO

Degree competences to which the subject contributes

Specific:
1. Ability to solve math problems that may arise in engineering. Ability to apply knowledge about: linear algebra, geometry, differential geometry to, differential and integral calculus, differential equations and partial differential, numerical methods, algorithmic numerical and statistical optimization.

Teaching methodology

(ENG) Receive, understand and summarize knowledge.
-Posing and solving problems.
-Developing arguments from a critical point of view and defending them.
-Doing work in group and individually.

Learning objectives of the subject

- To be able to apply the knowledge on basic functions, differential and integral calculus, numerical methods and statistics.
- To solve the mathematical problems that arise in engineering.
- To develop the capacity of abstraction while solving problems.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 30h</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
## Content

### Functions.

**Learning time:** 20h  
- Theory classes: 8h  
- Self study: 12h

**Description:**  
(ENG) Functional relations, properties and operations. Elementary functions: polynomials, rationals, exponentials, logarithm and trigonometric functions. Inverse functions. Functions in 1 i 2 variables, curves and surfaces.

**Related activities:**  
(ENG)

**Specific objectives:**  
(ENG)

### Derivation.

**Learning time:** 35h  
- Theory classes: 14h  
- Self study: 21h

**Description:**  

**Related activities:**  
(ENG)

**Specific objectives:**  
(ENG)

### Integration.

**Learning time:** 25h  
- Theory classes: 10h  
- Self study: 15h

**Description:**  

**Related activities:**  
(ENG)

**Specific objectives:**  
(ENG)
| (ENG) Ordinary Differential equations. | Learning time: 15h  
Theory classes: 6h  
Self study: 9h |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td></td>
</tr>
<tr>
<td>(ENG)</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>(ENG)</td>
<td></td>
</tr>
</tbody>
</table>

| (ENG) Numerical Methods.            | Learning time: 15h  
Theory classes: 6h  
Self study: 9h |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td></td>
</tr>
<tr>
<td>(ENG)</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>(ENG)</td>
<td></td>
</tr>
</tbody>
</table>

| (ENG) Statistics.                  | Learning time: 20h  
Theory classes: 8h  
Self study: 12h |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td></td>
</tr>
<tr>
<td>(ENG)</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>(ENG)</td>
<td></td>
</tr>
</tbody>
</table>
The final grade is the sum of the following partial grades: \( N_{\text{final}} = 0.90 \text{ NE} + 0.10 \text{ NC} \).

The \( \text{NE} = \text{Max}( \text{Nmig}, \text{Nf}) \) where

\[
\text{Nmig} = 0.60 \text{ Nf} + 0.40 \text{ Np}
\]

where
- \( \text{Nf} \): grade of the final test.
- \( \text{Np} \): grade of the parcial tests.

The final test consist of some theoretical questions about concepts related to the course' learning aims, and a set of problems that require the application of the methods studied. Its duration is 3 hours.

The continuous grade consist of one or two test (each one hour long), the participation in class and the supervised activities carried out during the semester.

**Regulations for carrying out activities**

- If some of the activities of the continuous grade are missed, the continuous grade is 0.
- A student which does not make the final test or the test for the continuous grade is being considered as 'No Presentat'.

**Bibliography**

**Basic:**


**Complementary:**


