280636 - Fundamentals of Mathematics II

Coordinating unit: 280 - FNB - Barcelona School of Nautical Studies
Teaching unit: 749 - MAT - Department of Mathematics
Academic year: 2020
Degree: BACHELOR'S DEGREE IN MARINE TECHNOLOGIES (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (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: 6
Teaching languages: Catalan

Opening hours
Timetable: Fall semester: Monday and Friday from 11:00 to 13:00, by appointment.
Spring semester: Tuesday, from 09:00 to 10:00, Wednesday, from 12:00 to 14:00.

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.
2. Ability to solve math problems that may arise in the field of naval engineering technology. Ability to apply knowledge of: linear algebra, geometry, differential geometry, differential and integral calculus, differential equations and partial, numerical methods, numerical algorithms, statistical and optimization.

Teaching methodology
- 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></th>
<th>Total learning time: 150h</th>
<th>Hours large group: 30h</th>
<th>20.00%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 30h</td>
<td>20.00%</td>
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<tr>
<td></td>
<td>Hours small group: 0h</td>
<td>0.00%</td>
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<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
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# 280636 - Fundamentals of Mathematics II

## Content

| Functions. | Learning time: 17h 30m  
|---|---|---|
| Theory classes: 7h  
| Self study : 10h 30m |  |

**Description:**  
Functional relations, properties and operations. Elementary functions: polynomials, rational functions, potential, exponential and trigonometric functions. Inverse functions. Functions in 1 and 2 variables, curves and surfaces.

**Related activities:**  
(ENG)

**Specific objectives:**  
(ENG)

| Differentiation. | 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)
# 280636 - Fundamentals of Mathematics II

## Series of functions.

**Learning time:** 17h 30m  
Theory classes: 7h  
Self study: 10h 30m

### Description:

### Related activities:
(ENG)

### Specific objectives:
(ENG)

## Ordinary differential equations.

**Learning time:** 27h 30m  
Theory classes: 11h  
Self study: 16h 30m

### Description:

### Related activities:
(ENG)

### Specific objectives:
(ENG)

## Numerical methods.

**Learning time:** 12h 30m  
Theory classes: 5h  
Self study: 7h 30m

### Description:
The final grade, Nfinal, is highest of Nmig and Npf

\[ N_{\text{final}} = \text{Maxim}(N_{\text{mig}}, N_{\text{pf}}) \]

where:

\[ N_{\text{mig}} = 0.40 \times N_{\text{ac}} + 0.60 \times N_{\text{pf}} \]

- Npf: grade of final test,
- Nac: continuous grade.

The final test consists of same 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 consists of two or three test (each one hour long), and the supervised activities carried out during the semester.

Reevaluation: If you have obtained a grade between 3 and 4.9, you can choose to reassessment will consist of a final test similar to the one described above.

**Qualification system**

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Learning time: 15h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Self study: 9h</td>
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</tbody>
</table>

| Description: |

| Related activities: |
| (ENG) |

| Specific objectives: |
| (ENG) |

**Sampling and statistical analysis. Mean and variance. Parameter estimation. Sampling distribution. Confidence interval. Testing hypotheses. 'X²' test.**

**Description:**

- If some of 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 in being considered as "No presentat"
Bibliography

Basic:


Complementary: