280636 - Fundamentals of Mathematics II

Coordinating unit: 280 - FNB - Barcelona School of Nautical Studies
Teaching unit: 749 - MAT - Department of Mathematics
Academic year: 2018
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

Teaching staff
Coordinator: FRANCESC TIÑENA SALVAÑÀ
Others:
Primer quadrimestre:
MARÍA ÁNGELES GRAU GÓTÈS - 1

Segon quadrimestre:
FRANCESC TIÑENA SALVAÑÀ - 1

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.
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- 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>
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<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>
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<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
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## Content

### Functions.

<table>
<thead>
<tr>
<th>Learning time: 17h 30m</th>
</tr>
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<tbody>
<tr>
<td>Theory classes: 7h</td>
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<tr>
<td>Self study: 10h 30m</td>
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</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Learning time: 35h</th>
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<tbody>
<tr>
<td>Theory classes: 14h</td>
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<td>Self study: 21h</td>
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**Related activities:**
(ENG)

**Specific objectives:**
(ENG)

### Integration.

<table>
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<th>Learning time: 25h</th>
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<tr>
<td>Theory classes: 10h</td>
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<tr>
<td>Self study: 15h</td>
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**Description:**Primitive of a function. Methods of integration. Definite integral. Integral function and the rule of Barrow. Applications: areas and volumes of revolution. Double and triple integrals: definition, iterated integrals and computation. Application: areas and volumes, computation of CM and inertial moments.

**Related activities:**
(ENG)

**Specific objectives:**
(ENG)
### Series of functions.

**Description:**

**Related activities:**
(ENG)

**Specific objectives:**
(ENG)

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

### Ordinary differential equations.

**Description:**

**Related activities:**
(ENG)

**Specific objectives:**
(ENG)

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

### Numerical methods.

**Description:**

**Learning time:** 12h 30m
- Theory classes: 5h
- Self study: 7h 30m
The final grade, $N_{final}$, is highest of $N_{mig}$ and $N_{pf}$

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

where:

- $N_{mig} = 0.40 \text{ Nac} + 0.60 \text{ Npf}$
- $N_{pf}$: grade of final test,
- $N_{ac}$: continuous grade.

The final test consists of same theoretical questions about concepts related to the course's 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 tests (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>Estatistics.</th>
<th>Learning time: 15h</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
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<tr>
<td></td>
<td>Self study: 9h</td>
</tr>
</tbody>
</table>

**Description:**

**Related activities:**
(ENG)

**Specific objectives:**
(ENG)

**Regulations for carrying out activities**

- 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"
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Bibliography

Basic:


Complementary: