280645 - Fluid Mechanics

Coordinating unit: 280 - FNB - Barcelona School of Nautical Studies
Teaching unit: 742 - CEN - Department of Nautical Sciences and Engineering
Academic year: 2018
Degree: 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) BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6 Teaching languages: Catalan

Teaching staff

Coordinator: ANNA MUJAL COLILLES

Opening hours

Timetable: Monday 10:00-12:00 Wednesday 10:00-12:00

Degree competences to which the subject contributes

Specific:
1. Knowledge of the fundamental concepts of fluid mechanics and its application to the operation and use of naval systems.
2. Knowledge of the fundamental concepts of fluid mechanics and its application to the hulls of ships and artifacts, and machines, equipment and naval systems.

Teaching methodology

- Analysis of the state of the art of the subject
- To acquire, understand and synthesize knowledge
- Setting-up and resolution of problems
- To carry works out individually and in group
- To apply computer analysis techniques

Learning objectives of the subject

- To acquire knowledge about the theory and concepts of the fluid mechanics.
- To know and be able to apply the basis of the fluid mechanics to the analysis of machinery, equipment and naval systems.
- To use the computer analysis resources to solve problems in fluid mechanics.
This course will evaluate the following STCW competences:
5. Operate fuel, lubrication, ballast and other pumping systems and associated control systems (STWC A-III_1)
The corresponding Knowledge, understanding and proficiency points according to the STWC competences are:
5.1. Operational characteristics of pumps and piping systems, including control systems
5.3 Oily-water separators (or-similar equipment) requirements and operation
# Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 35h</th>
<th>23.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>15h</td>
<td>10.00%</td>
</tr>
<tr>
<td>Hours small group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Guided activities:</td>
<td>10h</td>
<td>6.67%</td>
</tr>
<tr>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
## Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time:</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction to Fluid Mechanics</strong></td>
<td>10h</td>
<td>Theory classes: 10h</td>
</tr>
<tr>
<td><strong>Hydrostatics</strong></td>
<td>8h</td>
<td>Theory classes: 8h</td>
</tr>
<tr>
<td><strong>Basic equations of fluid mechanics</strong></td>
<td>8h</td>
<td>Theory classes: 8h</td>
</tr>
<tr>
<td><strong>Dimensional analysis and similarity</strong></td>
<td>4h</td>
<td>Theory classes: 4h</td>
</tr>
<tr>
<td><strong>Viscous flow in ducts</strong></td>
<td>5h</td>
<td>Theory classes: 5h, Practical classes: 0h</td>
</tr>
</tbody>
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### Introduction to Fluid Mechanics

- STWC A-III_1 KUP's are included: Oily-water separators (or-similar equipment) requirements and operation

### Hydrostatics


### Basic equations of fluid mechanics


### Dimensional analysis and similarity

- The principle of dimensional homogeneity. The Pi theorem. Nondimensionalization of the basic equations. Reynolds number.

### Viscous flow in ducts

Qualification system

The final mark will be the weighted average of all the different evaluating activities in the subject:

\[ N_{\text{final}} = 0.70 \cdot N_{\text{ex}} + 0.15 \cdot N_{\text{ec}} + 0.15 \cdot N_{\text{tc}} \]

- \( N_{\text{final}} \): final mark
- \( N_{\text{ex}} \): average mark of the two partial exams
- \( N_{\text{ec}} \): mark of the different individual questionaries and exercises
- \( N_{\text{tc}} \): mark of the practical work in groups

The re-evaluation will consist on carrying out a written exam, including theory and practical exercises. This exam will be focused on the aspects of the matter failed by the student.

Regulations for carrying out activities

The student not presenting to any of the activities of the course will be qualified as "not taken"

Bibliography

Basic:


Complementary: