240061 - Fluid Mechanics

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 729 - MF - Department of Fluid Mechanics
Academic year: 2019
Degree: BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: ESTEBAN JOU SANTACREU
Others: M.DEL CARMEN VALERO FERRANDO - ENRIQUE TRILLAS GAY - FRANCESC XAVIER ESCALER PUIGORIOL - ALEX PRESAS BATLLÓ

Degree competences to which the subject contributes
Specific:
1. Knowledge of basic principles of mechanical fluids and their application to solve engineering problems. Calculation of pipes, channels and systems of fluids.
Transversal:
2. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.

Teaching methodology
In the subject's sessions theory and problems are combined. Theoretical concepts are developed in classes and these are complemented with laboratory sessions.

Learning objectives of the subject
Provide students with basic knowledge and skills in the field of fluid dynamics. The student should be able to describe fluids at rest, in motion, and the effects of fluids on boundaries calculating the most significant magnitudes.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>50h</th>
<th>33.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>10h</td>
<td>6.67%</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
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</table>

In the subject's sessions theory and problems are combined. Theoretical concepts are developed in classes and these are complemented with laboratory sessions.
## Content

<table>
<thead>
<tr>
<th>Theme 1.-Basics concepts.</th>
<th>Learning time: 14h</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 3h</td>
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<tr>
<td></td>
<td>Self study: 5h</td>
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</tbody>
</table>

**Description:**

<table>
<thead>
<tr>
<th>Theme 2.- Basic Equations of Fluid Mechanics</th>
<th>Learning time: 38h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 15h</td>
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<tr>
<td></td>
<td>Laboratory classes: 1h</td>
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<tr>
<td></td>
<td>Guided activities: 21h</td>
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<tr>
<td></td>
<td>Self study: 1h</td>
</tr>
</tbody>
</table>

**Description:**

<table>
<thead>
<tr>
<th>Theme 3.- Dimensional Analysis and Similitude</th>
<th>Learning time: 20h 30m</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 9h</td>
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<tr>
<td></td>
<td>Self study: 11h 30m</td>
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</tbody>
</table>

**Description:**

<table>
<thead>
<tr>
<th>Theme 4.- Integral Analysis</th>
<th>Learning time: 1h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 1h</td>
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**Description:**
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Theme 5.- Boundary layer.

<table>
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<tr>
<th>Description:</th>
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<tbody>
<tr>
<td>Introduction. Structure, transition and separation of the boundary layer. Equations of the dynamic boundary layer on a flat plate. Equations of the thermal boundary layer on a flat plate.</td>
</tr>
</tbody>
</table>

Learning time: 41h
- Theory classes: 15h
- Laboratory classes: 2h
- Self study: 24h

Qualification system

The qualification obtained by the student will be:
NF1 = 0.2A + 0.35B + 0.45C
A: Mark of laboratory sessions.
B: Mark of the partial exam.
C: Mark of the final exam.

The final mark will be added one tenth for each of the five continuous assessment tests carried out by the student during the class schedule at the end of each subject.

Reassessment:
The test consists of a multiple-choice test of 20 questions with four answers. The right questions added 0.5 points, incorrect remaining 0.167. The mark of this test is directly subject mark and replace the previous mark.

Regulations for carrying out activities

Final Exam. The test consists of a multiple-choice test of 20 questions with four answers. The right questions added 0.5 points, incorrect remaining 0.167

Midterm Exam. The test consists of a multiple-choice test of 20 questions with four answers. The right questions added 0.625 points, incorrect remaining 0.209

Practice Exam: The test consists of a multiple-choice test of 10 questions with four answers. The right questions added 1 point, incorrect remaining 0.333

For the resolution of the test will not be allowed to consult books or notes. However, it will take the form of the department that will be posted on the digital campus. Forms that do not comply with the rules will be removed during the test.

Continuous assessment tests: At the end of each subject a Kahood test will be carried out with the people participating in class. The realization of these tests will be notified in the previous class. The ratings of the continuous evaluation are not validated.

Assessment practices: Attendance at each of the five practices and delivering a brief preliminary report represents half a point. The remaining 75% will be the mark obtained in the practical exam that takes place after the final exam. Practice mark are validated automatically.
Bibliography

Basic:


Complementary:


Others resources:

Audiovisual material

Transparències de classe

Col·lecció de problemes d'examen resolts

Col·lecció de test d'examen resolts

Guions de pràctiques