240061 - Fluid Mechanics

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 729 - MF - Department of Fluid Mechanics
Academic year: 2018
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 - EDUARDO EGUSQUIZA ESTEVEZ

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: 50h</th>
<th>33.33%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group: 10h</td>
<td>6.67%</td>
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<tr>
<td></td>
<td>Guided activities: 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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## 240061 - Fluid Mechanics

### Content

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Learning time</th>
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</table>
| **Theme 1.- Basics concepts.** | Introduction. Definition of fluid. Fluidodynamics properties. Hydro-static forces on surfaces. Field of speeds and accelerations. Flow description Flow classification. | **Learning time:** 14h  
Theory classes: 6h  
Laboratory classes: 3h  
Self study : 5h |
Theory classes: 15h  
Laboratory classes: 1h  
Guided activities: 21h  
Self study : 1h |
| **Theme 3.- Dimensional Analysis and Similitude** | Introduction. Buckingham Pi theorem. Similitude and model development. Correlation of experimental data. | **Learning time:** 20h 30m  
Theory classes: 9h  
Self study : 11h 30m |
Theory classes: 1h |
# Theme 5.- Boundary layer.

## Description:
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.

## Qualification system

The qualification obtained by the student will be:

\[
NF1 = 0.15A + 0.1B + 0.25C + 0.5D
\]

A: Mark of laboratory sessions.
B: Mark of continuous evaluation exercises
C: Mark of the partial exam.
D: Mark of the final exam.

**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 note.

## Regulations for carrying out activities

### Final Exam
The test consists of a multiple-choice test of 30 questions (maximum) with four answers. The right questions added 0.33 points, incorrect remaining 0.11.

### Midterm 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.

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: During the course exercises will be proposed at Atenea. Who has delivered more than 90% of the exercises have a continuous assessment mark equal to the grade obtained in the final exam. If delivered less than 90% the proportion obtained the note. The ratings of continuous assessment is not validated.

Assessment practices: Attendance at each of the first four practices and delivering a brief preliminary report represents half a point made practical. The eight remaining points are the marks obtained in the individual defense of the practices carried out in practice 5. This practice five, students will prepare a presentation with the results obtained in previous practices and expose them. The professor made some questions to assess the knowledge of the practice. Practice mark are validated automatically.
240061 - Fluid Mechanics

Bibliography

Basic:


Complementary:


Others resources:

Audiovisual material

Transparències de classe

Col·leció de problemes d'examen resolts

Col·leció de test d'examen resolts

Guions de pràctiques