Course guide
240762 - 240762 - Fluid Mechanics

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 729 - MF - Department of Fluid Mechanics.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGIES AND ECONOMIC ANALYSIS (Syllabus 2018).
(Compulsory subject).

Academic year: 2022  ECTS Credits: 6.0  Languages: English

LECTURER

Coordinating lecturer: Valentin Ruiz, David
Others: Escaler Puigoriol, Francesc Xavier
Jou Santacreu, Esteban

TEACHING METHODOLOGY

The classes are developed in their theoretical aspects and practical exercises (problems) jointly and by the same teacher. (The time indication that has been made in the program includes the discussion and resolution of the exercises). Students must attend the group in which they are enrolled.

The practices are done in the laboratories of the Department (experimental) and in the computer rooms of the school.

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>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>50,0</td>
<td>33.33</td>
</tr>
<tr>
<td>Hours small group</td>
<td>10,0</td>
<td>6.67</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

Theme 1.- Basics concepts.

Description:

Full-or-part-time: 30h
Theory classes: 10h
Laboratory classes: 2h
Self study: 18h
Theme 2.- Basic Equations of Fluid Mechanics

Description:

Full-or-part-time: 30h
Theory classes: 10h
Laboratory classes: 2h
Self study: 18h

Theme 3.- Dimensional Analysis and Similitude

Description:

Full-or-part-time: 30h
Theory classes: 10h
Practical classes: 2h
Self study: 18h

Theme 4.- Integral Analysis

Description:

Full-or-part-time: 30h
Theory classes: 10h
Laboratory classes: 2h
Self study: 18h

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.

Full-or-part-time: 30h
Theory classes: 10h
Laboratory classes: 2h
Self study: 18h
GRADING SYSTEM

The final grade will be the maximum of NF1, NF2, NF3 or NF4:

\[
\begin{align*}
NF1 &= 0.2A + 0.3B + 0.5C \\
NF2 &= 0.2A + 0.8C \\
NF3 &= 0.2A + 0.25B + 0.45C + 0.1AVC \\
NF4 &= 0.2A + 0.7C + 0.1AVC
\end{align*}
\]

where: A: Note of laboratory sessions
       B: Midterm exam
       C: Final exam
       AVC: Continuous assessment mark

The Continuous Assessment mark is one point of the final mark and will be assessed with various tests during class hours. In this way, participation and class attendance will be rewarded.

Reassessment: The grade for this test is directly the grade for the subject and replaces the previous grade if it is higher. The midterm exam does not remove subject matter.

EXAMINATION RULES.

For the resolution of the exams, the consultation of books or notes will not be allowed. However, it will be allowed to have the department form equations that will be posted on the digital campus. Non-official equation forms will be removed during the exam. Continuous assessment consists of completing different questionnaires during class time.

Laboratory marks: Attendance at each of the first four practical sessions will represent half a point per session. The remaining 80% will be the mark obtained in the presentation of the practice nº5. Laboratory labs are automatically validated.

BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Audiovisual material:
- Guia de pràctiques. Available at Atenea
- Transparències de classe. Available at Atenea
- Col·lecció de test d'exàmens resolts. Available at Atenea