Course guide
240630 - 240630 - Distribution Piping Systems

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

Degree: BACHELOR’S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).
Academic year: 2022  ECTS Credits: 4.5  Languages: English

LECTURER

Coordinating lecturer: FRANCESC XAVIER ESCALER PUIGORIOL
Others: FRANCESC XAVIER ESCALER PUIGORIOL

PRIOR SKILLS

Fundamentals of Fluid Mechanics

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:
1. 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

This course will consist of explanation lectures and sessions for problem solving. The explanation lectures will be used by the teacher to expose and comment with the students the theoretical concepts and equations. The lectures devoted to problem solving will require the student to participate actively and the teacher will provide orientation and support to solve the practical cases.

LEARNING OBJECTIVES OF THE SUBJECT

The objective of the course is that the student learns how to apply in an organized and systematic way the fundamentals that determine the fluid transport inside pipes. With such competences the student must be able to set out and/or resolve a liquid or gas flow system through a pipe net with different complexity. In particular, the student must:
- Identify the type of flow under study and its physical characteristics.
- Understand the equations that govern the pipe flow.
- Solve mathematically permanent incompressible pipe flow.
- Solve transient flow. Predict the water hammer.
- Solve mathematically permanent compressible pipe flow.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>45,0</td>
<td>40.00</td>
</tr>
<tr>
<td>Self study</td>
<td>67,5</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 112.5 h
CONTENTS

- FLUID MECHANICS REVIEW
  
  **Full-or-part-time:** 15h
  Theory classes: 3h
  Practical classes: 3h
  Self study: 9h

- INCOMPRESSIBLE PIPE FLOW
  
  **Full-or-part-time:** 22h 30m
  Theory classes: 4h 30m
  Practical classes: 4h 30m
  Self study: 13h 30m

- TRANSIENT FLOW. WATER HAMMER
  
  **Full-or-part-time:** 37h 30m
  Theory classes: 7h 30m
  Practical classes: 7h 30m
  Self study: 22h 30m

- COMPRESSIBLE PIPE FLOW
  
  **Full-or-part-time:** 37h 30m
  Theory classes: 7h 30m
  Practical classes: 7h 30m
  Self study: 22h 30m

ACTIVITIES

SOLUTION OF WRITING EXERCISES LESSON 1

**Full-or-part-time:** 6h
Self study: 6h

SOLUTION OF WRITING EXERCISES LESSON 2

**Full-or-part-time:** 9h
Self study: 9h

SOLUTION OF WRITING EXERCISES LESSON 3

**Full-or-part-time:** 10h
Self study: 10h
SOLUTION OF WRITING EXERCISES LESSON 4

Full-or-part-time: 10h
Self study: 10h

COMPUTATIONAL SIMULATION CASE 1

Full-or-part-time: 5h
Guided activities: 5h

COMPUTATIONAL SIMULATION CASE 2

Full-or-part-time: 5h
Guided activities: 5h

ATTENDANCE AND PARTICIPATION AT THE CLASSROOM

Full-or-part-time: 22h 30m
Practical classes: 22h 30m

GRADING SYSTEM

Final mark = 0.25*final exam mark + 0.25*solved exercises mark + 0.25*team work mark +0.25*classroom involvement mark

EXAMINATION RULES.

To pass, it is compulsory to obtain a result above zero in at least three of the four partial marks.

BIBLIOGRAPHY

Basic:

Complementary: