Course guide
820425 - EFM - Fluid Engineering

Unit in charge: Barcelona East School of Engineering
Teaching unit: 729 - MF - Department of Fluid Mechanics.
Degree: BACHELOR’S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
Academic year: 2023  ECTS Credits: 6.0  Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: RICARDO TORRES CAMARA - ALFRED FONTANALS GARCIA

Others:
Primer quadrimestre:
ALFRED FONTANALS GARCIA - Grup: T11, Grup: T12, Grup: T13
REYNA MERCEDES PEÑA AGUILAR - Grup: T11, Grup: T12, Grup: T13
RICARDO TORRES CAMARA - Grup: M11, Grup: M12, Grup: M13, Grup: M14
MARIO MIGUEL VALERO PÉREZ - Grup: M11, Grup: M12, Grup: M13, Grup: M14

Segon quadrimestre:
JOSE ALEJANDRO CARRILLO CORTES - Grup: T11, Grup: T12, Grup: T13
ALFRED FONTANALS GARCIA - Grup: M11, Grup: M12, Grup: M13, Grup: M14, Grup: M15,
Grup: T11, Grup: T12, Grup: T13, Grup: T14
TÀNIA TORM OBRADORS - Grup: M15
RICARDO TORRES CAMARA - Grup: T14

REQUIREMENTS
TERMODINÀMICA I TRANSFERÈNCIA DE CALOR - Prerequisit

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEMEC-24. Understand and apply the fundamentals of fluid mechanics systems and machines.

Transversal:
1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT
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>45.0</td>
<td>30.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>15.0</td>
<td>10.00</td>
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</tbody>
</table>

Total learning time: 150 h

CONTENTS

(ENG) Chapter 1: Fundamental Equacions in differential form

Description:

Specific objectives:
An understanding of the deduction of the equations of mass, momentum and energy in differential form including how to calculate the pressure field for a known velocity field and to obtain approximate and analytical solutions for simple flow fields.

Full-or-part-time: 8h
Theory classes: 8h

(ENG) Chapter 2: Dimensional and similarity. Modeling.

Description:

Specific objectives:
A knowledge of the scope of dimensional analysis in the study of fluid flow and its limitations. To identify characteristics scales correctly and to distinguish between different types of similarity. An ability to determine dimensionless groups and to know the physical meaning of the most important in the flow of fluids and fluid machinery. An ability to obtain partial similarity from simplifications.

Full-or-part-time: 7h 30m
Theory classes: 7h 30m

Chapter 3. Compressible flow

Description:

Full-or-part-time: 6h
Theory classes: 6h
(ENG) Chapter 4: Fluid systems

Description:

Specific objectives:
An ability to solve multiple-pipe systems and to determine fluid systems characteristics. An understanding of essential problems in stationary fluid systems. Combinations in series / parallel of pumps and fluid systems. An ability to matching pumps to system characteristics. An ability to avoid abnormal operating conditions like cavitation as well as to assess the effects of a water hammer.

Full-or-part-time: 8h
Theory classes: 8h

(ENG) Chapter 5: Lift and drag. External flow

Description:

Specific objectives:
An understanding of the effects of friction and pressure on drag and lift. An ability to know how to determine the fluid forces on common geometries and to describe the flow patterns around cylinders and spheres. An understanding of the models of the boundary layer and how to calculate their properties. An exposure to the difficulties of the turbulence: essential aspects of the turbulent phenomena and classification of the turbulence models.

Full-or-part-time: 7h 30m
Theory classes: 7h 30m

(ENG) Tema 6: Turbomàquines i màquines volumètriques

Description:

Specific objectives:
A knowledge of the classification of fluid machinery. An understanding of the dynamics in the impeller of the turbomachinery and its influence on the energy transfer. A knowledge of the different types of turbomàquines, of the essential functional elements and their areas of operation. An ability to use the similarity rules to re-design new turbomachinery. An understanding of the performance parameters of positive-displacement machines. A knowledge of the mechanical designs of PDM, of the selection criteria an of the use as power transmission systems.

Full-or-part-time: 8h
Theory classes: 8h
GRADING SYSTEM

To pass the course, the practical reports must have been completed and submitted. There will be test reassessment. Students will be able to access the re-assessment test that meets the requirements set by the EEBE in its Assessment and Permanence Regulations.

- Final assessment: 35%
- Exercises/problems: 10%
- Laboratory: 15%
- Generical competence: 5%

BIBLIOGRAPHY

Basic:

RESOURCES

Audiovisual material:
- Nom recurs. Resource

Hyperlink: