

60802 - Fluids Engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	532 - Master's in Industrial Engineering
ECTS	4.5
Course	1
Period	Half-yearly
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process for this subject relies on the acquisition of a theoretical background, exercise practice and hands on laboratory or computer work. The early and continuing study of the subject is encouraged through the academic semester. One to one mentoring is also provided as an effective means of clearing up difficult points or complex exercises. The key components of the learning process are:

- Classroom lectures. The whole group of students is expected to attend these lectures where the basic theoretical principles of the subject will be explained and discussed. Also during lectures typical exercises will be solved. Students will be prompted to discuss the theory as well as to participate in the solution of the exercises solved. Classroom lectures will be held 3 hours per week according to the timetable published by the School of Engineering

60802 - Fluids Engineering

management at the beginning of the academic year. Attendance to classroom lectures is strongly advised for a successful outcome.

- Hands on laboratory and computer work sessions will be held throughout the semester. These will take place in smaller groups (between 3 and 12 students on average), are compulsory and will be used in the overall grading of the subject. Work to be performed in each session is described in a written document available to the student in advance.
- Other mentoring and tutoring activities in smaller groups targeting a more detailed or deeper knowledge of particular theoretical questions or practical exercises. The lecturer office hours will be published in the school's e-learning platform at the beginning of the semester.
- Autonomous work and self study time. This is the backbone of the learning process and as such enough time must be devoted to it. It is estimated that some 85 hours of self study time is needed on average to pass the subject. It comprises understanding the theoretical concepts, acquire the ability to solve exercises and writing of reports.

5.2. Learning activities

IN-CLASS AND FACE TO FACE TO TEACHING: (45 hours)

1) Classroom lectures (T1 type activities) (22 hours)

Ordinary classroom lectures addressed to the whole group of students. The main theoretical background of the subject will be explained by the lecturer. Attendance and active participation by the student is fundamental to a successful outcome.

2) Exercise and case solving sessions (T2 type activities) (15 hours)

Classroom sessions in which exercises are posed, solved and discussed by the lecturer. Active participation of students will be encouraged and strongly advised. Open discussions ensuing an exercise or case solution will help get hold of difficult concepts and subtleties.

3) Hands on laboratory and computer work (T3 type activities) (8 hours)

Small group working sessions in the lab or in the computer room under teacher guidance to apply concepts and practice abilities explained during classroom or exercise solving lectures. Two such sessions with a duration of 2 hours each will be held in the fluid mechanics laboratory and two more sessions with the same duration will be held in the computer lab.

4) One to one mentoring (4 hours)

The lecturer is available for face to face mentoring 6 hours per week. This time represents an excellent opportunity for students to clarify concepts, solve problems or discuss strategies for exercise solving.

AUTONOMOUS WORK AND SELF STUDY: (64 hours)**4) Self study (T7 type activities) (60 hours)****5) Assessment tests (T8 type activities) (4 hours)****5.3.Program**

Module 1: Instrumentation in fluid flow systems

- General concepts
- Pressure measurements
- Velocity and flow measurements

Módulo 2: Multiphase flows

- Particle dynamics in fluid flow
- Particle separation and cleaning systems
- Neumatic transport systems

Módulo 3: Compressible flow

- Gas flow general properties
- Isentropic, isothermal and adiabatic flow. Flow with heat interaction
- Gas lines. Valves and other elements in compressible flow

Módulo 4: Transients in fluid systems

- Characteristic times in fluid systems
- Fluid inertia. Mass oscillations.
- Elastic fluid systems. Water hammer.

Módulo 5: Acoustics

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60802 - Fluids Engineering

Measurement of the sound intensity

- Noise generation in fluid systems
- Plane waves. Reflection and transmission of sound waves
- Noise propagation and attenuation in fluid systems

5.4.Planning and scheduling

Classroom and laboratory sessions follow the schedule set forth by the Engineering School management that is published at the beginning of every academic year. The particular schedule and student grouping of some laboratory sessions will be made available to the students during the course in the e-learning platform and announced in the classroom.

The teacher contact details and office hours for consultation and tutoring will be published in the e-learning platform at the beginning of the academic year.

Any outstanding activities will be scheduled during the course and published in the e-learning platform and announced in the classroom.

5.5.Bibliography and recommended resources