

Academic Year: ( 2019 / 2020 )

Review date: 08/05/2020 11:00:05

Department assigned to the subject: Thermal and Fluids Engineering Department

Coordinating teacher: RUBIO RUBIO, MARIANO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Fluid Mechanics

## OBJECTIVES

Competencies and learning results acquired by the student:

- Knowledge of a repertoire of experimental techniques, commonly used in Fluid Mechanics, as well as their physical and mathematical basis. This knowledge must enable the student to choose the most adequate technique for a particular problem.
- A critical attitude towards the interpretation of experimental results, either obtained by him/herself or found in the literature.

## DESCRIPTION OF CONTENTS: PROGRAMME

- Introduction to signal analysis
- Flow meters and pitot tubes
- Thermal anemometry (Hot wire)
- Laser Doppler Anemometry (LDA/LDV)
- Particle Image Velocimetry (PIV)
- Interferometric techniques (Schlieren, Shadowgraphy)
- Laser Induced Fluorescence (LIF)
- Characterization of particle-laden flows (drops/bubbles/solid particles)

## LEARNING ACTIVITIES AND METHODOLOGY

- Lectures where the techniques are described (1.5 ECTS)
- Practical sessions in the lab where the student will use different techniques to characterize some relevant flows. He/she will have to deliver a report based on the work the student performs in the laboratory concerning these techniques:
  - + Hot wire
  - + Laser Doppler Anemometry
  - + Particle Image Velocimetry
  - + Characterization of particle-laden flows
 (1.5 ECTS)

## ASSESSMENT SYSTEM

% end-of-term-examination/test:	0
% of continuous assessment (assignments, laboratory, practicals...):	100
Lab reports 100%.	

## BASIC BIBLIOGRAPHY

- Cameron Tropea (Ed.) Handbook of experimental fluid mechanics, Springer, 2007
- H.H. Bruun Hot-wire anemometry, Oxford Science Publications, 1995
- John G. Webster Measurement, instrumentation and sensors handbook, CRC Press, 1999
- Markus Raffel Particle image velocimetry : a practical guide, Springer, 2007
- Richard J. Goldstein Fluid Mechanics Measurements, Taylor & Francis, 1996

#### BASIC ELECTRONIC RESOURCES

- Finn E. Jørgensen, DANTEC DYNAMICS . How to measure turbulence with hot wire anemometers:  
<http://web.iitd.ac.in/~pmvs/courses/mel705/hotwire2.pdf>