

EXPERIMENTAL AERODYNAMICS

Program of classroom lectures and laboratory practice

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CLASSROOM LECTURES (each 2 hours)

1. Introductory notes and procedures.
Continuous and discrete tracers used in experimental fluid-mechanics
2. Light scattering from small particles.
Laser Induced Fluorescence (LIF) method.
Overview of velocity measurement techniques.
3. Ultrasound Anemometry (UA): principles and practice
4. Hot Wire Anemometry (HWA): principles and practice
5. Laser Doppler Anemometry (LDA): principles and practice
6. Particle Image Velocimetry (PIV): principles
7. Particle Image Velocimetry: practice
8. Particle Image Velocimetry: advanced procedures for image analysis
Methods for vortex detection.
9. Particle size measurements: principles and practice.
10. Signal and data processing: statistical moments and errors.
11. Signal and data processing: ensemble and time averaging.
Auto-correlation function.
12. Flow time scales derived from auto-correlation function.
13. Signal and data processing: spectral density function.
14. Examples of data and signals.

LABORATORY PRACTICE (each 4 hours)

- 1) Signal and data processing
- 2) Multihole Pitot tubes
- 3) Hot Wire Anemometry (HWA)
- 4) Ultrasound Anemometry (UA)
- 5) Laser Doppler Anemometry (LDA)
- 6) Particle Image Velocimetry (PIV)
- 7) Micro Particle Image Velocimetry (μ PIV)
- 8) Multiphase Flow Measurements