

**Course offered for the PhD program
in Civil, Chemical and Environmental Engineering
Curriculum in Wind Science and Engineering
Curriculum in Structural and Geotechnical Engineering, Mechanics and Materials
A.Y. 2017/2018 (XXXIII cycle)**

(possibility of participation for students in other PhD cycles or other PhD courses)

1. Title

Experimental flow modeling

2. Course description

The knowledge of flow, i.e. the description of how fluids behave and interact with their surrounding environment, has a significant influence on many aspects of civil, environmental and mechanical engineering. Concerning the wind flow, its analysis has a significant impact on urban climate and pollutant dispersion, on structural loading and on wind turbine production. The aim of the course is to provide ability to measure and model a flow with special reference to the experimental aspects of a wind tunnel.

3. Course Organization

The course consists of lectures and tutorials, in which the active involvements of the participants will be required:

Lecture 1: Wind tunnel modeling and measurements

Tutorial 1: Measurements in practice

Lecture 2: Homogeneous Flow Field (HFF)

Tutorial 2: Processing and simulation of HFF measurements

Lecture 3: Boundary Layer (BL) characterization

Tutorial 3: Processing and simulation of BL measurements

Lecture 4: Aerodynamic coefficients and quasi-steady modeling

Tutorial 4: Case studies on static tests

Lecture 5: Aeroelastic phenomena

Tutorial 5: Case studies on aeroelastic tests

4. Teachers

Andrea Freda, Giuseppe Piccardo

5. Duration and credits

10 hours (2 credits)

6. Activation mode and teaching period

The minimum number of participants to activate the course is 3. The course will be held in June-July 2018.

7. Deadline for registration

The deadline for applications is June 1st, 2018. Please, send an e-mail confirmation to Giuseppe Piccardo, giuseppe.piccardo@unige.it.

8. Final exam

Written examination (solution to a simple problem at the end of the course)

9. Recommended references

- ASCE/SEI 49-12 (2012). *Wind-Tunnel Testing for Buildings and other Structures*. American Society for Civil Engineers.
- Barlow, J.B., Rae, W.H., Pope, A. (1999). *Low-Speed Wind Tunnel Testing*, 3rd Edition. Wiley-Interscience.
- Paidoussis, M. P., Price, S. J., de Langre, E. (2010). *Fluid-structure interactions: Cross-flow-induced instabilities*. Cambridge University Press.
- Simiu, E., Scanlan, R.H. (1996). *Wind effects on structures: Fundamentals and applications to design*. John Wiley & Sons.