Course offered by the PhD program
in Civil, Chemical and Environmental Engineering
a.y. 2024/2025 (40 cycle)
(course is open for participation of students from other PhD cycles or programs)

1. Title
Experimental Simulation and Fragility Modeling of Structures under Extreme Winds

2. Course Objectives and Description
This course explores the nature of wind-structure interaction, with an emphasis on extreme wind events. Topics include:
1. The fundamental differences between Atmospheric Boundary Layer (ABL) winds and thunderstorm downbursts, as well as their physical simulation and implications for structural design loads.
2. The integrated use of various data types including field measurements, damage assessments, and wind tunnel testing to enhance understanding of how natural and built environments perform under extreme wind conditions.

The course will consist of five lectures as follows:
1. Fundamentals of Flow Characterization and Current Physical Simulation Methods for Downbursts
2. Aerodynamic Behavior of Buildings under Downburst Winds
3. Dynamic Response of Tall Buildings Subjected to Atmospheric Boundary Layer (ABL) Winds
4. Behavior of Electrical Transmission Lines under Downburst and ABL Wind Conditions
5. Development of fragility functions for structures subjected to extreme winds using different data types

3. Course Organization
The Course will consist of five lectures. Students will complete a series of assignments throughout the course, designed to reinforce key concepts and evaluate their understanding of wind-structure interactions.

4. Teacher
Dr. Amal Elawady, Florida International University (FIU)

5. Duration and credits
12 hours, 2 credits

6. Activation mode and teaching period
15-25 July 2025

7. Deadline for registration
14 July 2025, please email to federica.tubino@unige.it and massimiliano.burlando@unige.it to register

8. Final exam
The assignments completed by the students throughout the course will be evaluated by the instructor.