



Northeastern University  
Department of Civil and Environmental Engineering

## CIV G354 Wind Engineering

**Catalog Description:** *Atmospheric circulation, atmospheric boundary layer winds, bluff-body aerodynamics, introduction to random vibration theory, response of structures to fluctuating wind loads, aeroelastic phenomena, wind-tunnel and full-scale testing, non-synoptic winds (hurricanes, tornadoes, etc.), wind-load standards and design applications.*

**Pre-requisites:** none

**Text and Other Required Materials:** (recommended) Simiu E. and Scanlan R.H., Wind Effects on Structures, 3<sup>rd</sup> edition, 1996, Wiley and Sons, New York, NY, USA.

**Instructor:** Luca Caracoglia, 441 Snell Engineering Center, X5186, lucac@coe.neu.edu (for emergency: cell 617.820.2502)

**Office hours:** Not scheduled. Please call or e-mail for appointment

**Course web site:** n/a

### TOPICS

1. Introduction to geophysical aerodynamics (atmospheric circulation, boundary layers winds), applied fluid dynamics, turbulence
2. Bluff-body aerodynamics
3. Introduction to random vibration theory (structural dynamics)
4. Design of civil engineering structures affected by wind loads (rigid and flexible systems)
5. Design recommendations and wind codes (ASCE7)
6. Non-synoptic winds (hurricanes, tornadoes) vs. boundary layer winds, wind hazards
7. Fluid-structure interaction phenomena for flexible structures (aeroelasticity)
8. Introduction to experimental techniques (wind-tunnel and full-scale testing)

### COURSE OBJECTIVES

1. To equip graduate students with methods and techniques for the design of structural systems under the influence of wind loading, emphasizing the needs of the practicing engineer.
2. To promote the importance of wind hazards and dynamic effects on structures.
3. To encourage graduate students towards the development of further interests in this field.

### EXAMS AND ASSIGNMENTS

Four to five homework assignments will be given and must be completed on time. A mid-term test is planned (open-book). A final project is tentatively scheduled, to be chosen between (i) professional track (e.g., design of a specific structure), (ii) individual study. The project might be replaced by a final exam, depending on the number of students.

### POLICIES ON NEATNESS AND ACADEMIC HONESTY

University policies on neatness and academic honesty will be adhered to.

### GRADING FORMULA

20% Homework, 30% Midterm, 50% Final project (or exam).