

CEE 566  
**Wind Engineering**  
Fall, 3:00-4:20pm MW

Instructor: Professor Ning Lin, E-Quad E328, nlin@princeton.edu

Texts:

John D. Holmes, *Wind Loading of Structures (Second Edition; 2007)*

Emil Simiu, *Design of Buildings for Wind: A Guide for ASCE 7-10 Standard Users and Designers of Special Structures (2011)*

References:

Emil Simiu and Robert H. Scanlan, *Wind Effects on Structures: Fundamentals and Applications to Design (1996)*

D. E. Newland, *An Introduction to Random Vibrations, Spectral & Wavelet Analysis (Third Edition; 2005)*

Kerry Emanuel, *Divine Wind: The History and Science of Hurricanes (2005)*

Siobhan Roberts, *Wind Wizard: Alan G. Davenport and the Art of Wind Engineering (2012)*

Prerequisites: Undergraduate-level Probability and Statistics (e.g., ORF 309 or CEE460), Differential Equations, and, preferably, Fluid Mechanics and Structural Dynamics.

Grading: Homework (40%) and Course project (60%)

Syllabus:

Lecture 1. Introduction to Wind Engineering

Lecture 2. Basic Meteorology

Lecture 3. Weather Systems and Storms

Lecture 4. Hurricanes

Lecture 5. Hurricane Hazards (wind, surge, rainfall)

Lecture 6. Probability

Lecture 7. Wind Climatology I

Lecture 8. Wind Climatology II – Hurricane climatology

Lecture 9. Boundary Layer Wind I – Mean wind profile

Lecture 10. Random Process

Lecture 11. Boundary Layer Wind II – Turbulence

Lecture 12. Bluff Body Aerodynamics

Lecture 13. Wind Tunnel Theory

Lecture 14. Wind Loads I – Wind-tunnel case study

Lecture 15. Wind Loads II

Lecture 16. Structural Dynamics

Lecture 17. Random Vibration (RV)

Lecture 18. RV – Single degree of freedom

Lecture 19. RV – Multi-degree of freedom

Lecture 20. RV – Multi-degree of freedom II

Lecture 21. RV – Distributed system

Lecture 22. Windborne Debris Aerodynamics

Lecture 23. Guest Lecture

Lecture 24. Project Presentations and Discussion