



International Doctorate in Civil and Environmental Engineering

DOCTORAL COURSE – A.Y. 2020/21

Title **Extreme Winds and their Interactions with Civil Structures**

Teacher: **Dr. Grace Yan**, Associate Professor
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Calendar	
17/05/2021, 3:00-5:00 PM	Bluff-body aerodynamics and wind effects on civil structures
24/05/2021, 3:00-5:00 PM	ASCE 7-16 specification on design wind loading
31/05/2021, 3:00-5:00 PM	Approaches in simulation of wind fields
07/06/2021, 3:00-5:00 PM	Tornadoes: wind characteristics and actions on civil structures
14/06/2021, 3:00-5:00 PM	Hurricanes: wind characteristics and actions on civil structures
Total	10 hours - 5 credits

Program
This course will introduce the fundamentals of atmospheric boundary layer winds, investigate the fluid flow around civil engineering structures using bluff-body aerodynamics, details how to predict wind, provide basic knowledge of computational fluid dynamics for modeling of winds and wind effects on structures, covers non-synoptic winds with special focus on tornadoes and hurricanes, and details the design of civil engineering structures for wind loading. The advanced research in the WHAM lab will be used to inform teaching.
<u>Assessment:</u> Homework and design project to be done at home by students.

Extra information

Prerequisites: Structural Analysis I with a grade of "C" or better.

Reference Books

1. ASCE (2016). Minimum design loads for buildings and other structures (ASCE7-16), American Society of Civil Engineers, Reston, VA, USA
2. Simiu, E., and Scanlan, R. H. (1996). Wind effects on structures, John Wiley and Sons, New York, NY
3. Simiu, E., (2011). Design of buildings for wind. A practical guide for ASCE-7-10 Standard users and designers of special structures (2nd edition), John Wiley and Sons, Hoboken, New Jersey, USA
4. Simiu, E., and Miyata, T. (2006). Design of buildings and bridges for wind. A practical guide for ASCE-7 Standard users and designers of special structures, John Wiley and Sons, Hoboken, New Jersey, USA
5. Dyrbye, C., and Hansen, S. O. (1997). Wind loads on structures, John Wiley and Sons, Chichester, UK
6. Holmes, J. D. (2007). Wind loading of structures (2nd edition), Spon Press, London, UK