

CIVE 504 Wind Engineering – Fall Semester 2013

[CIVE 504-001 (CRN 62557)]

(Rev. August 7, 2013)

Catalog Description: Influence of wind on humanity, applications to buildings and structures, air pollution, mass/snow transport, human comfort, wind power, and broader wind impacts.

Meeting Times: 8:00-8:50 a, MWF, Engineering Building, Rm. B2

Instructor: Bogusz Bienkiewicz, Rm. A207B Engineering Building (Rm. A127 Engineering Research Center), 491-2026 (491-8232).

Textbook (tentative/optional): Simiu, E. and R. H. Scanlan, *Wind Effects on Structures*, John Wiley & Sons, Inc.

Course Objectives: The course is designed for students interested in adverse and beneficial wind effects on built and natural environment, human comfort, wind energy and broader wind impacts. The students will learn principles of deterministic and statistical description of wind, evaluation of its effects, assessment of broader impacts, and development of practical measures to mitigate undesired and harness beneficial effects of wind.

Successful students will accomplish the following in this course:

1. Develop understanding of the principal concepts of wind engineering, in context of adverse and beneficial effects of wind on human activities, and its impacts on natural and built environment.
2. Develop analytic and mathematical skills appropriate to carry out wind engineering assessments.
3. Relate the discussed principles and skills to address wind engineering issues encountered in practical problems of civil engineering and related disciplines.

Course Topics/Weekly Schedule:

Week	Topics
1	Global circulation and effects of earth rotation
2	Effects of friction
3	Wind characteristics, atmospheric and surface shear layer turbulence
4	Wind-tunnels and modeling of atmospheric boundary layer winds
5	Extreme wind characteristics and analysis for wind engineering
6	Risk analysis associated with wind environment and effects
7	Local and global wind loading
8	Structural dynamics for wind engineering
9	Bluff body aerodynamics for buildings and structures
10	Cross-wind loading and response, aeroelastic effects
11	Physical and computer modeling of wind loading and response
12	Atmospheric advection and dispersion
13	Wind-induced mass and snow transport
14	Wind power and control of wind environment
15	Societal and economic effects of wind

Methods of Evaluation: Periodic homework problem sets will be assigned. Special design or paper review project will be assigned. Students will make a brief oral presentation on this assignment. Two equally weighted exams and a final (comprehensive) exam will be given. The course grade will be based on the following distribution: Homework problems - 20%; Exam I - 20%; Exam II - 20%; Design project/review paper - 5%; Final exam - 35%.