Louisiana State University  
Colleague of Engineering  
Dept. of Civil & Environ. Eng.

CE 7701 Special Topics in Civil Engineering  
Wind Engineering (3 credits)

Course Outline

Instructor: Dr. Aly Mousaad Aly  
Office: 3513D Patrick F. Taylor Hall  
Phone: 225-578-6654  
Email: aly@LSU.edu  
Office Hours: TBA

Semester: Spring 2014

Class Hours: Tuesday & Thursday 12:00PM – 1:30PM (can be adjusted)  
Patrick F. Taylor Hall 1114

Credits: 3 hours (in class)  
6 hours (out of class: reading, assignments, and project)

Prerequisites: Nothing.

Objectives: The main objective of this course is to give participants a knowledge of wind engineering for structural design beyond just application of a design code or standard such as ASCE-7. By the end of the course, students should be able to:

ii) understand the momentum and continuity equations to atmospheric fluid mechanics problems. Apply the Classical Boundary Layer Theory to determine the Atmospheric Boundary Layer (ABL) mean and turbulent velocity profiles. Use the boundary layer laws to determine ABL characteristics from site measurements.

iii) carry out simple extreme value analyses of wind speeds, and predict design wind speeds for specified mean recurrence intervals, adjust mean and gust wind speeds for the effect of terrain, height and topography.
iv) understand the pressure distribution and associated aerodynamic loading for typical bluff bodies: use these pressure distributions to calculate the main aerodynamic loading; understand the main concepts related to mean and fluctuating internal pressures in buildings.

v) determine whether or not resonant dynamic response to wind is significant, and carry out dynamic analyses for wind for simple structures: know how to calculate the background and the resonant structural responses due to wind based on a theoretical approach as well as through simplified and code approaches; be introduced to the typical Boundary Layer Wind Tunnel techniques for wind engineering applications.

vi) assess pressure and load coefficients for unusual structures, and those that are not given in Standards such as ASCE-7.

**Prescribed texts:**


**References:**


**Grading Scale:**

The final course mark will be determined as follows:

- Final examination* 50%
- Course Projects 40%
- Class Participation and assignment 10%

*Students must pass the final examination to pass this course.

The total grade is assigned as follows:

- A 90 – 100%
- B 80 – 89%
- C 70 – 79%
- D 60 – 69%
- F below 60%

**Policy**

Students are responsible for attending classes and exams. All students should respect the right of others to have an
equitable opportunity to learn and honestly demonstrate the quality of their learning. All students are deemed by the university to understand that if they are found responsible for academic misconduct, they will be subject to the academic misconduct procedures and sanctions, as outlined in the Code of Student Conduct.

**Tentative Schedule:**

**Classes**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Governing Equations</td>
<td>1</td>
</tr>
<tr>
<td>Atmospheric Boundary Layer</td>
<td>3</td>
</tr>
<tr>
<td>Design wind speeds</td>
<td>2</td>
</tr>
<tr>
<td>Bluff-body aerodynamics</td>
<td>2</td>
</tr>
<tr>
<td>ASCE 7 Standard Provisions</td>
<td>2</td>
</tr>
<tr>
<td>Rigid Buildings</td>
<td>2</td>
</tr>
<tr>
<td>Flexible Buildings</td>
<td>4</td>
</tr>
<tr>
<td>Bridges</td>
<td>2</td>
</tr>
<tr>
<td>Computational Wind Engineering</td>
<td>2</td>
</tr>
</tbody>
</table>