

Rubric Title of course Instructor(s)	CIVL 4380 Introduction to Wind Effects on Buildings and Structures Tim K.T. TSE
Prerequisites Credit	N/A 3
Textbook(s) and/or other materials	<p>References:</p> <ol style="list-style-type: none"> 1. Holmes JD. Wind Loading of Structures. 2nd Edition. London: Taylor & Francis; 2007 2. Dyrbe C, Hansen SO. Wind Loads on Structures. New York: John Wiley & Sons; 1997. 3. Simiu E, Scanlan RH. Wind Effects on Structures: Fundamentals and Applications to Design. 2nd Edition. New York: John Wiley & Sons; 1996. 4. Paz M. Structural Dynamics - Theory and Computation. 4th Edition. Van Nostrand Reinhold, NY; 1997. <p>Wind Code:</p> <ol style="list-style-type: none"> 1. Building Department of Hong Kong, "Code of Practice on Wind Effects in Hong Kong 2004", 2019. 2. AS/NZ1170.2, Australian/New Zealand Standard, Structural Design Actions, Part 2: Wind Action, Standards Australia & Standards New Zealand 2021.
Course objectives	<p>Upon successful completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Describe the characteristics of wind, wind structure near ground and topographical effects on wind; 2. Identify the factors that affect the structural design of a building against wind; 3. Determine the alongwind and crosswind forces of a structure and the wind-induced structural responses; 4. Analyse dynamic problem of buildings subject to different dynamic loads 5. Perform a tall building design following Hong Kong and Australian wind codes;
Topics	<p>Global wind climate Wind climate in Hong Kong Design wind speed in Hong Kong Wind structures near ground Introduction to wind pressure Wind forces and moments Formulation of equation of motion Undamped and damped free vibration Harmonic and periodic excitation Random vibration and spectral analysis Along-wind response of structures Cross-wind response of structures Interference excitation of tall buildings. Code of Practice of Wind Effects in Hong Kong 2004 & 2019 AS/NZ Standard, Structural Design Actions Part 2: Wind Actions 2021</p>
Computer usage	Spreadsheets
Lab projects	No lab work required
Class/lab schedule	3 hours lectures per week

Contribution to the professional component	80% engineering topics 20% communication
Relationship to program objectives	<p>This course contributes to the (1) through (4) program objective as follows:</p> <ol style="list-style-type: none"> <u>1. Provide professional skills in design, construction and management</u> The assignments and group project in this course require students to apply international design wind codes. <u>2. Train students with good communication skills</u> Students are formed in groups to deliver a project and to present at the end of the course, through which communications between teammates are encouraged. Discussion sessions are also arranged to improve their communication skills. <u>3. Stimulate self-learning and innovative problem solving skills</u> This course requires students to complete a project on a topic of wind engineering decided by themselves. <u>4. Expose students to real projects and cutting-edge research</u> Some lectures are scheduled to present up-to-date cutting-edge research projects. Guest lecturer(s) may be invited to give lecture on special topic.
Relationship to program outcome	<p>This course contributes to the program outcomes as follows:</p> <ol style="list-style-type: none"> <u>1. Obtain fundamental knowledge in mathematics and science</u> Theories and equations in mathematics and science are covered in various part of this course <u>2. Understand fundamental principles of engineering science</u> Students must apply engineering principles to complete assignments <u>5. Formulate problems and propose feasible solutions</u> Students are required to choose their own topic for a group project, to deliver the report, and to present at the end of this course <u>6. Design engineering components and system</u> International design wind codes of practices are used in assignments for structural design of tall buildings <u>8. Obtain in-depth knowledge in at least one specialized area</u> Wind loading and wind-induced vibrations of buildings are emphasized <u>9. Communicate ideas effectively and able to work in teams</u> A group project is designed to strengthen students' communication skills and teamwork capability <u>12. Stay abreast of contemporary issues</u> Results of up-to-date cutting-edge research issues/projects are presented
Assessment of outcomes	<p>This course contributes to the assessment of program outcomes as follows:</p> <ol style="list-style-type: none"> 4 homework assignments (20%) allow for detailed assessment of students' understanding of the course materials. [Outcomes 1, 2, 6, 8 & 12] Students are divided into groups to complete a project (10%) and to present results at the end of this course. [Outcomes 1, 2, 5, 8 & 9] 2 lectures are scheduled for group discussions under the guidance of instructor and/or teaching assistants. Presentations (10%) of results of group projects are conducted at the end of this course, where students are required to give feedbacks. [Outcomes 5 & 9] A final examination (60%) allows to assess outcomes 1, 2, 5, 6 & 8.
Prepared by	Tim K.T. TSE
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