CVEN90024 High Rise Structures

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2016, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 52 hours (Lectures: 38 hours per semester; Workshops, including some computer laboratories: 14 hours per semester) Total Time Commitment: 200 hours
Prerequisites:	Admission to Master of Engineering Structures OR

Subject	Study Period Commencement:	Credit Points:
CVEN30009 Structural Theory and Design	Semester 2	12.50

Corequisites:	None
Recommended Background Knowledge:	Knowledge gained in the following subject will assist learning:

Subject	Study Period Commencement:	Credit Points:
CVEN90049 Structural Theory and Design 2	Semester 1	12.50

Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
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Subject Overview:	**AIMS** This subject introduces students to the special requirements necessary for the successful design of high rise buildings. Elements of high rise building design considered in the subject are structural floor, framing and foundation systems, wind loading including wind tunnel testing and earthquake loading, analysis techniques including computer-aided analysis, vertical movements and second order effects, facade design, construction methods, sustainability concepts and a review of case study buildings. The subject builds on fundamental structural engineering knowledge and when learnt together with other structural engineering electives will provide students who successfully complete the subjects a well-rounded knowledge of a range of structural engineering design skills. Students who complete this subject may find work in a structural engineering consultancy or as a site

	engineer and work under the supervision of a chartered professional engineer on high rise building designs or design variations. **INDICATIVE CONTENT** Introduction to high-rise design; introduction to finite element analysis; loads and design criteria for tall buildings; gravity load resisting; structural systems; gravity loads; lateral load resisting structural system; SpaceGass modelling; wind loading and analysis; earthquake induced loading; distribution of lateral loads to structural elements; coupled core systems and outriggers; theoretical treatment for column beam frames; architectural aspects and sustainability concepts; extreme loading effects; foundations of tall buildings; and, construction methods. Skills acquired from the above topics will be integrated and applied to the assignment which consists of a detailed analysis of a typical high rise building.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** On completion of this subject the students is expected to: 1 Describe the multi-disciplinary nature of designing a tall building and the role of a structural engineer in the design of tall buildings 2 Describe the design criteria and loading conditions for buildings 3 Develop conceptual designs of floors using different floor systems 4 Develop conceptual designs of lateral load resisting systems for buildings 5 Calculate dynamic wind loads on tall buildings using the dynamic response factor approach 6 Interpret wind tunnel test results to obtain equivalent wind loads 7 Understand the concepts behind perception of motion, calculate the serviceability acceleration levels in tall buildings responding to wind loading 8 Develop approximate models for analysing structural systems in buildings 9 Develop computer models for analysing structural systems in buildings 10 Develop conceptual designs of foundation systems for different buildings and soil types 11 Identify different facade systems commonly used in building structures 12 Identify and analyse different structural systems using case study buildings.
Assessment:	A 500 word assignment (4%) requiring approximately 5 hours of work. Due mid semester. Intended Learning Outcomes (ILOs) 2 to 5 and 9 to 12 are addressed in this assignment A 2500 word assignment (26%) requiring approximately 30-35 hours of work. Due mid semester. ILOs 2 to 5 and 9 to 12 are addressed in this assignment One 3 hour written end-of-semester examination (70%). ILOs 1 to 12 are addressed in this examination.
Prescribed Texts:	None
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	# Ability to apply knowledge of science and engineering fundamentals # Ability to undertake problem identification, formulation, and solution # Ability to utilise a systems approach to complex problems and to design and operational performance # Proficiency in engineering design # Ability to conduct an engineering project # Ability to communicate effectively, with the engineering team and with the community at large # Ability to manage information and documentation # Capacity for creativity and innovation # Understanding of professional and ethical responsibilities, and commitment to them # Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member # Capacity for lifelong learning and professional development.
Notes:	**LEARNING AND TEACHING METHODS** The subject will be delivered through a combination of lectures, tutorials and workshops. Theoretical basis of the subject will be covered in lectures and tutorials. The workshops will consist of modelling exercises to support materials covered in the lectures and to provide hands on experience to the students looking at different aspects of practical examples. **INDICATIVE KEY LEARNING RESOURCES**

	Students will have access to lecture slides and notes on select aspects of structural design of high rise buildings prepared by Priyan Mendis and Anil Hira, selected journal publications, EXCEL spreadsheets showing examples of numerical simulations, exercises and examples on Space Gass and Strand7 computational packages and demonstration of ETABS software. **CAREERS / INDUSTRY LINKS** Lecturers are involved in designing high-rise buildings in Australia and overseas. In addition, a practising specialist in the field of high rise structures will contribute to the teaching of the subject by delivering a two hour lecture and providing notes.
Related Course(s):	Doctor of Philosophy - Engineering Master of Engineering Structures Master of Philosophy - Engineering
Related Majors/Minors/ Specialisations:	B-ENG Civil Engineering stream Master of Engineering (Civil) Master of Engineering (Structural)