UNIT COORDINATOR
Professor Hong Hao

LECTURER
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Consultation hours: Monday 14-15 pm, Wednesday 14-15 pm, Friday 14-15 pm

ONLINE RESOURCES
Further information about this unit (including a copy of this unit outline) may be obtained from:
<http://www.civil.uwa.edu.au/teaching/CIVL4110/>

INTRODUCTION
The objective of the course is to provide an introduction to dynamic structural response analysis of single degree of freedom (SDOF) and multiple degree of freedom (MDOF) structures to earthquake, blast, wave and man-made dynamic loads. Topics include the free-vibration analysis, vibration frequency and mode shape, damping of structures, harmonic, periodic and arbitrary dynamic loads, estimation of blast, earthquake, wave and man-made dynamic loads on structures, design of structures against these dynamic loads, discussions of the (AS1170.4 2007) Australian Seismic Loading Code, discussions on blast-resistant design according to TM5-1300, P-I curve, and man-made (traffic, blasting, soil compacting and pile-driving) ground vibrations and their effects on structures. Students are expected to develop the ability to apply knowledge of fundamental theory of structural dynamics to dynamic structural response analysis and design; achieve technical competence and practical skills in structural dynamics; and undertake problem identification, formulation and solution.

The course comprises 39 lectures and 26 tutorial sessions. The following major topics will be covered:
- Formulation of equation of motion of SDOF structure systems
- Undamped and damped free vibration analysis of SDOF systems
- Dynamic response analysis of SDOF systems to harmonic, pulse and arbitrary dynamic loads
- Numerical methods (Central difference and Newmark) to solve the dynamic equations
- Definition of earthquake loads and structural response analysis to earthquake loads
- Response spectrum method, design response spectrum and application
- Definition of wave and blast loads and structural response analysis
- Definition of man-made dynamic loads and their effects on structures
- MDOF system analysis, frequency and mode shapes
- Modal analysis
- Absolute sum, SRSS and CQC rules
**ASSESSMENT MECHANISM STATEMENT**

Assessment consists of compulsory weekly assignments, a mid-semester test, and a final examination. Final grading of the unit is based on semester two only. No supplementary assessment will be available for the unit. Final unit marks may be modified in accordance with Faculty policy (see [http://www.ecm.uwa.edu.au/for/students/assess](http://www.ecm.uwa.edu.au/for/students/assess)).

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<thead>
<tr>
<th>Assessment</th>
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<td>1 Weekly assignments based on the lectures; accessed via the World Wide Web. For details of the assessment and marking procedure refer to: <a href="http://www.civil.uwa.edu.au/teaching/CIVL4110">http://www.civil.uwa.edu.au/teaching/CIVL4110</a></td>
<td>20%</td>
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<td>2 1-hour mid-semester test</td>
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<td>4 3-hour final examination</td>
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**TEXTBOOK**

**RECOMMENDED READING**

- Craig, R. Structural Dynamics: Wiley 1981

**IMPORTANT INFORMATION**

- Students should be aware of the University guidelines on Academic Misconduct (see [http://www.ecm.uwa.edu.au/for/students/plagiarism](http://www.ecm.uwa.edu.au/for/students/plagiarism))
- Students should be aware of the Faculty Policy for Appeals (see [http://www.ecm.uwa.edu.au/for/students/exams](http://www.ecm.uwa.edu.au/for/students/exams))
- Students should be aware of the Charter of Student Rights (see [http://www.secretariat.uwa.edu.au/home/policies/charter](http://www.secretariat.uwa.edu.au/home/policies/charter))