

Engineering and Information Technologies

Unit of Study Description

CIVL4240 Concrete Structures 2

Unit Coordinator	A/Prof Stuart Reid s.reid@civil.usyd.edu.au
School	School of Civil Engineering
Credit Value	6
Session	Semester 2
Prerequisites	<u>CIVL3205</u>
Assumed Knowledge UoS	<u>CIVL2201</u> <u>CIVL3235</u> <u>ENGG1802</u>
Brief Description	The objectives of this unit are to develop a deep understanding of the fundamental behaviour and design of reinforced and prestressed concrete and concrete-steel composite members and structures. By the end of this unit, students will develop sufficient understanding of fundamental concepts and acquire sufficient knowledge and skills to assess strain-softening effects in concrete structures, the effects of prestressing and the effects of interaction of composite materials. Students will be able to apply the relevant design requirements, in accordance with Australian design standards.
Lecturer(s)	Dr Gianluca Ranzi, g.ranzi@civil.usyd.edu.au A/Prof Stuart Reid, s.reid@civil.usyd.edu.au
Text or Reference Book(s)	<u>REFERENCE</u> : Standards Australia, <i>HB2.2 Structural Engineering Standards</i> , Standards Australia, Edn:.,0 7337 5027 3 <u>REFERENCE</u> : Warner, RF et al, <i>Concrete Structures</i> , Longman, Edn:.,1998,0 582 80247 4
Teaching & Learning Sessions	<u>Lecture</u> , Workload : 3 hours per week, presented in 2 session(s) per week for 12 week(s) of semester. presentation of information and discussion of concepts and calculation procedures <u>Tutorial</u> , Workload : 1 hours per week, presented in 2 session(s) per week for 13 week(s) of semester. Class work to facilitate commencement of work on illustrative problems (including assignments) <u>Laboratory</u> , Workload : 2 hours per week, presented in 1 session(s) per week for 1 week(s) of semester. laboratory demonstration of yield line behaviour of concrete slab

	<p><u>Independent Study</u>, Workload : 5 hours per week. independent study to complete work on illustrative problems (including assignments)</p>
Graduate Attributes	<p><u>Discipline Specific Expertise</u>, Level : Advanced advanced expertise required for engineering analysis and design related to: assessments of the effects of strain softening and plasticity in reinforced concrete structures; and assessments of composite steel/concrete structures.</p> <p><u>Science and Engineering Fundamentals</u>, Level : Advanced understanding of the theoretical concepts and engineering models that provide the basis for current methods of analysis and calculation procedures concerning: the effects of strain-softening and plasticity in concrete structures; the behaviour of composite steel/concrete structures; and the behaviour of prestressed concrete structures.</p> <p><u>Design and Problem Solving Skills</u>, Level : Intermediate-Advanced ability to formulate and solve problems using appropriate methods of analysis</p>
Learning Outcomes	<p>1. competence in calculation skills required for structural analysis and design accounting for: strain-softening and plasticity in reinforced concrete structures; and the behaviour of composite steel/concrete structures. (Graduate Attribute Type : Discipline Specific Expertise)</p> <p>2. understanding of the theoretical concepts and engineering fundamentals underlying the analysis and design procedures presented. (Graduate Attribute Type : Science and Engineering Fundamentals)</p> <p>3. ability to formulate and solve relevant problems using appropriate methods of analysis and design (Graduate Attribute Type : Design and Problem Solving Skills)</p>
Assessment Components	<p><u>Assignment</u>: assignments on ductility, moment redistribution and yield line analysis Weighting = 15 : Week Due = Multiple Weeks Target Outcomes = 1 2 3</p> <p><u>Quiz</u>: 4 quizzes on composite steel/concrete structures Weighting = 50 : Week Due = Multiple Weeks Target Outcomes = 1 2</p> <p><u>Final Exam</u>: 2 hr final exam on plastic behaviour of concrete slabs. Weighting = 25 : Week Due = Exam Period Target Outcomes = 1 2 3</p> <p><u>Mid-Sem Exam</u>: test on moment redistribution Weighting = 10 : Week Due = Week 7 Target Outcomes = 1 2 3</p>
Grading Description	<p>Grades in this unit are awarded at levels of HD (High Distinction), D (Distinction), CR (Credit), P (Pass) and F (Fail) as defined by Academic Board Resolutions: Assessment and Examination of Coursework. Details of Academic Board Resolutions are available on the University's Policy website at</p>

	<p>http://www.usyd.edu.au/ab/policies/Assess_Exam_Coursework.pdf. Standards for grades in individual assessment tasks and the summative method for obtaining a final mark in the unit will be set out in a marking guide supplied by the unit coordinator.</p>
<p>Syllabus/Schedule</p>	<p><u>Week 1</u>: reinforced concrete: full moment-curvature relationship</p> <p><u>Week 2</u>: reinforced concrete: section ductility and plastic hinges</p> <p><u>Week 3</u>: reinforced concrete: moment redistribution</p> <p><u>Week 4</u>: reinforced concrete: moment redistribution</p> <p><u>Week 5</u>: plastic behaviour of reinforced concrete slabs; yield line analysis</p> <p><u>Week 6</u>: yield line analysis, including laboratory demonstration</p> <p><u>Week 7</u>: mid-semester test (moment redistribution); lower-bound methods for strength assessment of plastic slabs</p> <p><u>Week 8</u>: lower-bound slab strength for an elastic distribution of moments (including torsion); basic concepts of prestressed concrete analysis</p> <p><u>Week 9</u>: composite steel/concrete structures: basic concepts (flexure)</p> <p><u>Week 10</u>: composite steel/concrete structures: ultimate strength in flexure and shear (including partial shear connection)</p> <p><u>Week 11</u>: composite steel/concrete structures: time-dependent effects of concrete creep and shrinkage</p> <p><u>Week 12</u>: composite steel/concrete structures: ultimate strength of columns</p> <p><u>Week 13</u>: Review text/enhanced</p> <p><u>Study Week</u> : This week is left free for independent study.</p> <p><u>Exam Period</u> : Any Exam or Quiz worth more than 30% of the final assessment will be scheduled in this two week period.</p>

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Authorised by: Associate Dean Undergraduate. **Last Updated:** Fri 29-05-2009, 12:00 AM

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