CVEN90049 Structural Theory and Design 2

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2014.
Time Commitment:	Contact Hours: 48 hours (Lectures: 30 hours, Workshops/Laboratories: 18 hours) per semester Total Time Commitment: 120 hours
Prerequisites:	Successful completion of the following subject is required: **Subject** | **Study Period Commencement:** | **Credit Points:** CVEN30009 Structural Theory and Design | Semester 2 | 12.50
Corequisites:	None
Recommended Background Knowledge:	None
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 more advanced methods of structural analysis and design, and their applications to the engineering of reinforced concrete and structural steel in compliance with the standards. Students will be given the opportunity to integrate the use of different materials into the design of contemporary structures through design projects. This subject would typically be that final subject in the sequence of structural engineering subjects for civil engineering students who do not want to specialise in structural engineering. **INDICATIVE CONTENT** Topics covered include: structural analyses of beams and frames by the stiffness matrix method; computer analysis using SPACEGASS; virtual work and influence line diagram; design of thin walled sections, structural design of reinforced concrete beams, slabs and columns; structural design of steel beams, columns and connections.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** Having completed this unit the student is expected to: 1 Implement Displacements Methods (involving the use of stiffness matrices) for the analysis of indeterminate beams and frames 2 Be familiar with a structural analysis package (eg. Spacegass) as applied to a common structural system

	3 Implement Virtual Displacement method and reciprocal theorem for the construction of Influence lines 4 Implement the design of RC beams, columns and slabs with combined loading 5 Implement the design of thin walled sections for the determination of the shear centre and torsional analysis 6 Describe the concepts of uniform/non-uniform torsion; asymmetrical bending 7 Design structural systems involving the combined use of materials
Assessment:	One 3-hour examination, end of semester (70%) One 2000 word group assignment, due week 6 (10%) Four 250 word laboratory assignment reports, due at regular intervals throughout the semester (5% each) Intended Learning Outcomes (ILOs) 1, 2 and 4 are addressed in the four assignment reports.ILO 7 is addressed in the group assignment.ILOs 1 - 6 are addressed in the examination.
Prescribed Texts:	None
Recommended 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 for 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 function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member
Notes:	**LEARNING AND TEACHING METHODS** The subject will be delivered through a combination of lectures, tutorials and workshops. In addition, students will undertake a design exercise which involves applying the learnt techniques in solving problems that are likely to be encountered in practice. **INDICATIVE KEY LEARNING RESOURCES** Students will have access to lecture slides, recommended reading materials, Steel Structures Design Handbook HB48 by Standards Australia, Australian Standard AS3600 for the Design of Concrete Structures, EXCEL spreadsheets showing examples of numerical simulations and SPACE GASS package. The subject's LMS site also contains worked solutions for all tutorial problems. **CAREERS / INDUSTRY LINKS** Representatives from Steel Reinforcement Institute of Australia will contribute to the teaching of the subject. In addition, practising structural engineers will also contribute to the teaching of the subject and give advice on the assignment exercises. Students who successfully complete this course would typically find employment in a civil engineering consultancy or contracting company and could use the knowledge from this subject to propose designs or design variations under the supervision of a chartered professional engineer.
Related Course(s):	Bachelor of Engineering (Civil) and Bachelor of Science
Related Majors/Minors/ Specialisations:	B-ENG Civil Engineering stream Master of Engineering (Civil with Business) Master of Engineering (Civil) Master of Engineering (Structural)