CVEN90035 Structural Theory and Design 3

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2015, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus. There will be one intensive week for Steel Design Project. Classes are all day from Wednesday to Friday, inclusive.
Time Commitment:	Contact Hours: 60 hours, comprising of three hours of lectures per week and 24 hours of workshops per semester Total Time Commitment: 200 hours
Prerequisites:	Admission to the 746ST Master of Engineering Structures OR

Subject	Study Period Commencement:	Credit Points:
CVEN90049 Structural Theory and Design 2	Semester 1	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** The major objective of this unit is to develop an understanding of the procedures and processes involved in the design of structures made of structural steel, cold-formed steel, composites, timber or masonry, and be able to produce effective and economical design solutions through correct integration of these materials. This subject features simulated structural design exercises which involve participation by senior experienced practicing engineers. These exercises consist of both conceptual and detailed designs which consider constructability, functionality, sustainability as well as compliance with standards to ensure safety and serviceability. **INDICATIVE CONTENT** Conceptual and preliminary design of structures and design parameters, structural analyses of frames and trusses by the stiffness matrix method, computer analysis by a commercial

	package, design of structural steel and connections, design of cable stayed bridges, engineering of cold-formed steel, structural design of concrete-steel composite beams, structural design of timber elements and connections.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** Having completed this subject the student is expected to: 1 Conceptual design of structures and the determination of design parameters 2 Analyse structures using approximate methods for the sizing of members in the preliminary design stage based on the considerations of gravity, operational and environmental loads 3 Undertake computer analyses of frames and trusses based on the construction and use of stiffness matrices which are manipulated by EXCEL spreadsheets 4 Undertake computer analyses of a structural system by the use of a commercial package (e.g. Spacegass) and have the output verified by comparison with results from hand calculations and from EXCEL 5 Undertake preliminary and detailed design of a typical structure 6 Design steel members and their connections and stiffening using relevant design standards 7 Recognise behaviour of cold formed steel and design for local buckling 8 Design simply-supported concrete-steel composite beams 9 Identify basic properties of timber and factors affecting its behaviour 10 Design timber elements and connections to resist tension, bending and compression.
Assessment:	One 6000 word group design report (in groups of 5 students), requiring approximately 35 hours of work (Steel Design Week) (30%) One 1000 word group design report (in groups of 5 students), requiring 15 hours of work (10%) One written three hour end-of-semester examination (60%). Intended Learning Outcomes (ILOs) 1 - 6 are addressed in the assignments. ILOs 6 - 10 are addressed in the examination.
Prescribed Texts:	Handbook HB48 Structures Design Handbook (Pham, L., Boxhall, P., and Mansell, D.) Standards Australia 1999 Steel Designers Handbook (Gorenc, B., Tinyou, R., and Syam, A.) UNSW Press 2005.
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 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 and tutorials. In addition, this subject features simulated structural design exercises which involve participation by senior experienced practicing engineers. These exercises consist of both conceptual and detailed designs and are aimed at training students to apply materials learnt from the lectures in solving design problems in practice. **INDICATIVE KEY LEARNING RESOURCES** Students will have access to lecture slides, recommended reading materials including selected journal publications and EXCEL spreadsheets showing examples of numerical simulations, and structural analysis commercial package SPACEGASS. **CAREERS / INDUSTRY LINKS** The design projects involve active participation by international engineering consulting firm URS and representatives.
Related Course(s):	Master of Engineering Structures Master of Philosophy - Engineering

	Ph.D.- Engineering
Related Majors/Minors/ Specialisations:	B-ENG Civil Engineering stream Master of Engineering (Civil) Master of Engineering (Structural)