MCEN40011 Advanced Computational Mechanics

Credit Points:	12.50
Level:	4 (Undergraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus. On campus only
Time Commitment:	Contact Hours: 36 hours of lectures. Total Time Commitment: 120 hours
Prerequisites:	The prerequisites for this subject are **431-202** Engineering Analysis B or 620-331 Applied PDE's
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 Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability
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Subject Overview:	Upon completion, students should be able to comprehend a wide variety of numerical computational techniques for solving ordinary and partial differential equations frequently encountered in engineering problems and identify the strengths and weaknesses of the various competing computational methods. Topics covered include modelling engineering systems using ordinary and partial differential equations; finite difference schemes; and weighted residual methods and spectral methods. All necessary theories in order for students to be able to use commercial computational fluid dynamics (CFD) software proficiently.
Objectives:	At the conclusion of this subject students should be able to: # Solve complex ordinary differential equations using advanced numerical techniques # Solve linear and nonlinear partial differential equations using finite difference methods # Derive higher order finite difference schemes. # Apply and interpret the meaning of Fourier transforms of complex functions. # Analyse the error propagation of commonly used discretization schemes using Fourier techniques

Assessment:	One 3-hour end-of-semester examination (60%); two assignments, each not exceeding 50 pages including diagrams, tables, computations and computer output due throughout the semester (20% each).
Prescribed Texts:	None
Recommended Texts:	Information Not Available
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 basic science and engineering fundamentals # In-depth technical competence in at least one engineering discipline # Ability to undertake problem identification, formulation and solution # Capacity for independent critical thought, rational inquiry and self-directed learning
Notes:	This subject may not be offered every year. Please refer to the Department of Mechanical Engineering.
Related Course(s):	Bachelor of Engineering (EngineeringManagement)Mechanical&Manufacturing Bachelor of Engineering (Mechanical &Manufacturing)& Bachelor of Science Bachelor of Engineering (Mechanical &Manufacturing)/Bachelor of Commerce Bachelor of Engineering (Mechanical and Manufacturing Engineering) Bachelor of Engineering (Mechatronics) and Bachelor of Computer Science